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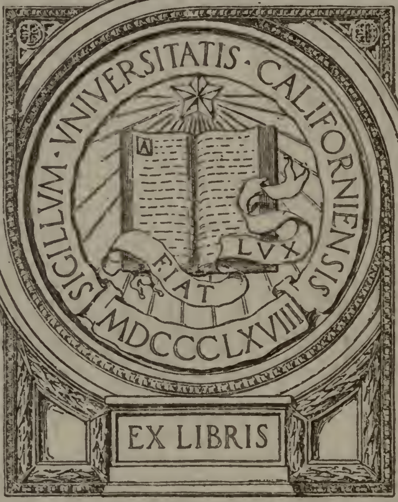

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# PUBLIC UTILITY ECONOMICS

completely dishonest

A SERIES OF TEN LECTURES
DELIVERED BEFORE THE

**West Side Young Men's Christian Association**
New York

UNIV. OF
CALIFORNIA

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Gift of "Finance Forum".

# PREFACE.

The Finance Forum is conducted by the West Side Y. M. C. A., New York, as a branch of the Educational Department. It was inaugurated in 1905 and its courses of instruction have included a wide range of financial subjects. The policy of the Forum has been to invite as speakers men of practical experience, and many of the most representative members of the business community have lectured on the particular branches of finance in which they have gained distinction.

Public Utilities was chosen as the subject of the 1913–1914 course, particularly because of the prominence of such securities in the investment markets. The connection between the investor and the engineering and operating features of Public Utilities is direct. Of no less interest and importance is the relationship between the investor and the consumer, and the public attitude toward the utility company. The widened public appreciation of both the service and the problems of the utility company is interwoven with nearly every subject broached in the course. The accompanying index shows how all these varied interests were represented.

The *Electrical World* commented as follows on the course in its issue of March 14, 1914:

> "Aside from the interest which attaches to the subject matter of the lectures themselves, the Public Utility lecture course recently inaugurated by the Fiance Forum of the Y. M. C. A. in New York, referred to in this issue, has considerable significance as a sign of the times. A strictly practical organization like the Y. M. C. A., the principal object of whose existence is to secure and hold the attention, sympathy and interest of young men and to offer them some clean and profitable way of spending their leisure time for the good of their minds, bodies and morals, may be assumed to know something of the ways and means best calculated to achieve these results. The Finance Forum selected the subject of Public Utilities for the lecture course simply for the reason that the young men wanted to learn something about utilities. Since these young men are drawn indiscriminately from the public and may fairly be taken as types of the educated American, it would seem that the general public in 1914 is beginning to realize the desirability of understanding a little more of the technique and economics of public service. The electrical interests should be truly grateful that the public is exhibiting this tendency."

The course consisted of ten lectures and aroused widespread interest. Their economic importance induced the Y. M. C. A. to waive its custom in such matters and allow these lectures to be distributed first in single pamphlets and now in this volume, without further copyright than already taken on parts of the course by the authors.

The request is particularly made that excerpts be used only with credit accorded to the Finance Forum of the West Side Y. M. C. A., New York.

This volume includes a summary of each lecture and a full index of the subjects and references.

## Committee:

The Finance Forum of the Y. M. C. A. invited co-operation of business men associated with the financial, engineering, operating and manufacturing branches of the Public Utility industry and in earnest accord with the purpose of diffusing knowledge of the subject, the following Advisory Committee has assisted the Y. M. C. A. in its course:

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## MAGNITUDE OF THE ELECTRIC LIGHT, POWER AND TRANSPORTATION BUSINESS.

**T. Commerford Martin.**

The growth of investment in electrics since 1877 when Mr. Martin entered Mr. Edison's laboratory—A basis of property and earning power behind every dollar of the ten billions of electric company securities—Two billion dollars is earned annually by electrical properties—American dependence on electricity—Statistics of manufactures—Evolution of electrical utilities, beginning with the telegraph, all due to invention—Growth of the central station—Hydro-electrics and their influence on manufacturing; California; the Carolinas—The electric lamp; its great increase in efficiency—Decline in lighting costs—A forecast by Mr. Edison in 1879—Advice from Mr. Carnegie—Telegraph in the United States; Paris; London—Telephone efficiency due to private ownership; more telephones in many American cities than in entire European countries—Conservation in fuel resources due to electricity—Morality of corporate financing.

## THE PUBLIC, THE INVESTOR AND THE HOLDING COMPANY.

**Francis T. Homer.**

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### Arthur Williams.

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### T. P. Sylvan.

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## FUTURE OF PUBLIC UTILITIES.

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## CENTRALIZATION OF POWER SUPPLY.

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# Magnitude of the Electric Light, Power and Transportation Business

### By T. Commerford Martin

I am to speak on the magnitude of the electric light and transportation industries of this country, but anything that I might say after what you have listened to, will come to you possibly with the deadening cold chill of an under-statement.

## Electrical Investments

The electrical industries of this country are altogether a modern chapter in its development. It is perfectly true that when I entered Mr. Edison's laboratory in 1877, the total investment in electrical industries in this country was somewhere in the vicinity of fifty million dollars, the whole of it being devoted to the exploitation of telegraphy, and at that time any young man who wanted to make a future or a career in electrical development, thought of electricity in connection with telegraphy, and nothing else. To-day, the capitalization and investment, and I use those terms synonymously, because I believe that practically for every dollar of capitalization, we can show investment and earning power equivalent, is not less than somewhere in the vicinity of ten billions of dollars, all of which has been the creation of the last thirty-five years. I believe—and I have studied a great deal those figures of American development, having the capacity of looking upon them impartially, as one who did not have the disadvantage of being born where he could not help himself, but being an American by choice—I believe that such figures are unsurpassed, but I will call your attention in a minute or two to a few figures which show that even in those years of our outgrowth and outpush and development, we have surpassed anything that the earlier years foreshadowed or promised.

## A Force of Civilization

Those ten billions of dollars are deriving from the American public, and returning to the American people in service, about two billions of dollars per year. There is no country in the world in regard to which such amazing and outstanding statistics can be cited or quoted. Our great American philosopher, Emerson, once said that Steam was half an Englishman, and I would like to cap that with a corollary and say that Electricity is not merely half an American, but a little bit more, and I would like to add to that the proposition that it is fair to suggest that civilization to-day in all the best interpretations that we can give it, is to be measured by the use that you make of electricity. We, Americans, to-day spend a great deal more on electricity than we do on daily bread, and the most interesting fact in that whole proposition, in the whole argument and statement, is this; that we in this country have done it entirely along the line and on the principle of favoring individual enterprise, and until very recently by the support and the promotion and development of private ownership. There are facts in such figures which give us food for thought, and should at least make us hesitate when we are confronted with propositions of turning over our natural resources and our vast enterprises which have made such extraordinary development, to government ownership, operation and control. This is not problemical, but simply a statistical statement.

### Utility to Manufacturers

I am giving you a few figures very briefly. First of all, our electrical arts are predicated upon electrical manufacturing. At one time the electrical manufacturer controlled and dictated that which should be done by the use of the apparatus, but when I tell you that the value of the electrical goods in this country every year is about $300,000,000 and the total of electrical use of such apparatus and its service by the public is $2,000,000,000, you can realize that that condition has long ago been inverted. Electrical manufacturing, as such, however, is not to be limited merely to the apparatus and the goods which bear a distinctly and definite electrical designation. It may interest you perhaps to know that practically every pound of copper which—I won't say every pound, but practically every pound of copper turned out in this country, as an article of manufacture, and every pound and every ounce of aluminum, is electrical in method of production; and so it goes all down the line, in our universal application of electricity to every art and trade and industry.

### Evolution Through Invention

I have given you the figures with regard to telegraphy, and it will interest you to know that in the year 1912 the total income of the land telegraph systems of the country was fifty-six million dollars. The earnings of the electric street railway systems of the country last year were six hundred and fifty millions of dollars. And when I was with Mr. Edison in 1877 and 1878, helping him perfect the automatic telegraph and put the telephone into condition, not making his inventions for him, but giving him a great deal of assistance in that direction (laughter), there was not one single mile, not a foot of electric railway in the world, and here today, in our country, the street railway systems alone are earning six hundred and fifty million dollars, and that does not include all the passenger trains that are running on our commuters' systems into New York City on the Long Island and Pennsylvania and the New York Central, nor all the long distance passengers that are brought in, probably representing another fifty millions of dollars. You can see how one great field of invention relatively shrinks into unimportance and insignificance as other fields come along.

## Growth of Central Stations

Now, I am going to give you a few interesting figures as to electrical expansion. For example, the income from central station companies in 1902, eighty-five millions of dollars, has increased in 1913 to four hundred and fifty millions, and the average rate of increase for the period of the ten years has been twenty-five per cent. a year. And the interesting fact in connection with that is that for ten years prior to that, the income and the business were then also increasing at the same rate. I will challenge any industry in this country to produce figures which are much better than that. An average rate of increase for twenty years of twenty-five per cent.

## Hydro Electric Power

But that is not the most interesting thing in that connection. We have had lately, in the last five or six years, a wonderful outburst and development of hydro-electric plants for power transmission, so that some of those plants have circuits operating at seventy thousand volts over distances of 210 and 240 and 250 miles. If you will start out from Washington in the morning for the southern gate-way, Atlanta, the whole day long shining tracks of steel will be overpassed and criss-crossed by the shining tracks of aluminum and copper distributing power from three or four great plants to hundreds and hundreds of cotton mills and factories all over the South. And those electric tracks overhead are carrying more power in a few hours than all those steel tracks can carry in days in the shape of coal.

And more than that, with the wonderful electrical power development in the South, the South today has run ahead and snatched from New England, its supremacy in cotton manufacture, so that the South today is not only the center of cotton production, but the great home of American cotton manufacture.

Now, you will agree with me that that is not only a startling revolution, but a transformation which carries with it social transformations which go down to the very depths of our well-being. And that has been done by this little industry which I have the honor to speak for tonight.

## California and Carolina

Let me give you one or two significant figures. In the State of California, over thirty-two counties of the State are served by one company, which reaches with its wires, over 200 communities, and over 3,000 miles of those circuits are operated at a voltage of over 60,000 volts, pressures which even five or six years ago, we hardly dreamed of as possible, utilizing wasted water powers. In North and South Carolina today the development is even more extraordinary. North Carolina, for example, shows in ten years an increase in electric motors operated in the State, at the rate of 3,535 per cent., with an increase in capacity in water wheels of 2,500 per cent. Match it if you can in any other industry in the United States or the world.

And there lies our hope, and it is to such figures as those we point when we ask for the greatest possible freedom of individual enterprise and private capital, for the development of wasted water power for the benefit of the nation at large.

## Evolution of Lamps

An interesting fact in connection with these central station figures is that some of them illustrate how, unconsciously and insensibly, we have been working at some of the greatest problems of conservation, which figure large on the political program, and make war cries for political parties, but which with our rapidly improving apparatus, our higher methods of economy, and our greater efficiencies, we are solving just as though there never was or will be a political question connected with it. Take our good old friend the arc lamp, for example. When I first came into the industry, the arc lamps were way up in the sky. The first I ever saw were in Union Square, about 250 feet high, on the top of a pole. Supposed to be a very admirable imitation of moonlight. (Laughter.) Within the last ten years, the old arc lamps in use in this country, the great standby of the single station industry in years gone by, have fallen off nearly 100,000, and the result is that in a few years, we may possibly look upon the arc lamp as just as much a relic as the horse car is—I mean outside of New York City. We have increased the efficiencies of our incandescent lamps to such a marvelous extent that we can buy an infinitely greater quantity of light for the same price than we did a few years ago, and there is an interesting fact in that connection, that while the cost of living has gone up steadily—oh, not steadily, but by leaps and bounds—in practically every department, electrical service cost to the public has gone down.

## Decline in Lighting Costs

In 1885, one dollar would purchase 1,600 candlepower; in 1906, we could get 2,700 candlepower for the same dollar; in 1912, we had brought it up to 3,300 candlepower. That was with lamps at one and a quarter watts per candle, and only last September at Cooperstown, I saw some magnificent incandescent lamps of from 500 to 5,000 candlepower, which were operating at half a watt per candle.

I got a letter this week from one of our correspondents asking me what was the relative comparison between gas and electricity. Now, here I am on delicate ground, but it is interesting to note that in 1912, when the output and total income of central stations in this country was $350,000,000, the production of artificial gas was $133,000,000. Now, this is not any guessing contest as to the most popular beauty in the community. I simply offer you the statistics.

## Edison's Forecast

And it reminds me that when I was in Mr. Edison's laboratory in 1878 or 1879, somewhere around that recent date, I got a letter from my father in England. My father and one of my uncles had been very largely interested in developing the gas plant in my native town, and the announcement of the incandescent lamp had put a quiver in the legs of the gas magnates of England. And my father wrote and asked me to ask Edison whether he would recommend that they sell out their securities. And with fear and trembling I took this letter to Mr. Edison and showed it to him. My father quoted the prices of the stock and told about his investment. "Well," he said, "Martin, if your old man is more level-headed than you are, he will buy all the stock he can lay his hands on, because I am not going to do any harm to the gas industry. I am going to promote the greater use of light, and in the long run, gas will find its own field, its legitimate field, and there will be more of it used than ever before." And remember, this was 1879, probably.

## Advice from Carnegie

I think it was a wonderful prediction. Which reminds me of another little fact in connection with predicting about electricity. I quoted you the figures of the income from the electric railways of the country as being about six hundred and fifty millions of dollars. My distinguished friend Mr. Carnegie asked me the other day how I thought electric railways were doing in general, and I told him what I thought about it, and gave him some interesting facts, and then I said that about twenty years ago in a lecture before the New York Electrical Society, I had predicted that there would not be a steam locomotive operating in New England inside of ten years. I said, "Another ten years have gone by, and there are still several of them in operation, chiefly on the New York, New Haven & Hartford Railroad." I said, "But I believe the prediction was a sound one even if I was not quite right as to the time in which the revolution would be required to take its course." And he shook his head, and in his canny Scotch way, he said, "Well, Martin, it is a very good thing for young men to prophesy, but they should never fix dates." (Laughter.)

## Instructive Comparisons

I have given you a brief relative outline of our electrical development. ¶I would like to mention one or two interesting points in closing up this discursive talk, and that is with regard to the relative rate of development or expansion of our electrical industries. The telegraph industry is barely growing at all, and there is one very good reason for that in the fact that we make such an enormous use of the telephone. Now, I am not indulging in political controversy, but I have recently been reading some figures and statistics from Washington purporting to come from the Postmaster General, and pointing out how vastly greater is the use of the telegraph that they make in England than they do in this country. Well, God bless them, they can have it. I was over in Paris last October, and tried for hours to use the Government telephone system. I might just as well have tried to talk to the moon. Instead of continuing my efforts, I either took a taxi or sent some of those little letters that they call petit bleu, and they go there every time, with more or less delay, of course, consequent on being Government service.

I got back to London, and was there for a week before I left at the end of November, and had a lunch engagement with some twelve or fourteen central station managers of that great city, and owing to the Government regulation, instead of having in that magnificent metropolis, one splendid unified, harmonious co-ordinated system, as we have in New York, they have thirty-eight different plants in operation, and something like fifty authorities who have got a right or power to deliver juice to the unfortunate customer. Well, you can imagine what kind of a system that is.

Well, the Government has recently taken over the telephone system, and there was a slight change of hours necessary in my arrangements for that luncheon, and for two hours a friend and I tried to reach the different gentlemen and notify them of the change of time. At last, in sheer disgust, we threw it up and sent taxicabs for them.

That is the kind of service that the distinguished Postmaster General in Washington is recommending to us.

## What Private Ownership Has Done for Telephones

And I want to give you a few figures which I think will be illustrative of the point that I am making. They are very significant. London is three times as large as Chicago, and has fewer telephones. Paris is twice as large as Boston and has only one-half as many. Liverpool is three times as large as Los Angeles, and has barely one-third as many telephones. Birmingham, that great industrial throbbing heart of England, has over 500,000 population, with 4,000 fewer telephones than Grand Rapids, Michigan, which has only 140,000 people. In all of France there are fewer telephones than in Chicago. In Russia there are fewer telephones than in Philadelphia. In all of Italy—and that is a pretty progressive country, even if some of the most enterprising citizens do occasionally look in on us, in Italy there are less telephones than Los Angeles. There are more telephones in Toledo, Ohio, than in all Spain. And there are more telephones in Kansas City than the whole of Belgium. And all the telephones in this country have been developed by our own individualism and private enterprise, and every one of those countries has got a Government system, and we are recommended to adopt it. (Applause.) What do you think we want with it as compared with our successful systems, with these figures I have presented to you, or with our street railway companies? Do we want to be checked and choked and cut down and repressed? It is simply impossible to think it of America or the American people.

## Electricity and Conservation

A word or two more in regard to power transmission. We are doing more to-day in the conservation of energy by our modern power transmission than has ever been attempted in our history, and it is being done by such companies as I have spoken of here tonight, the Central Station companies and the Street Railway companies of the country. We have, for example, the utilization of the Mississippi River at Keokuk, at an investment of twenty-five millions, reaching St. Louis 140 or 150 miles away. And on Lake Spokane another with a spill-way dam, the largest in the world, 200 feet high, 170 feet long, impounding a storage lake twenty-three miles long. We have the enterprises to which I have referred, in the South, and out in California. I think you will agree with me that such an industry as these superficial figures indicate, is one of infinite possibilities. It has lately come under more or less regulation and control, and I think that is for the good of us all. I would like to sum it up in a few words and say that we have passed in these public utilities from the age of evasion, and have reached the age of explanation.

There was a statement in the papers to-day about the connection of a banking house with a great enterprise, and it showed what clean hands the banking house had. (Applause.) And we in public utilities are just as patriotic and just as clean-minded and just as straight and clean-thinking as any other of our fellow-citizens. We get a mighty poor return for the work that we do. These electrical industries to which I have called your attention, think themselves lucky if they can turn their capital over once in five or six years. There is not a dry goods merchant in New York City who would not think himself infernally unlucky if he could not do that five or six times in a single year. Our profits are moderate, they are equitable, and based on justice, and all that we ask and all that we expect and all that we want is to be allowed to go on in this career of development and progress for the good of the people, in the best industries that civilization knows. (Applause.)

# The Public, The Investor and The Holding Company

**By Francis T. Homer**

Gentlemen, it is rather a strange fact that just at the present time there should be evidence that so simple a thing as a holding company should be misunderstood and misapprehended, not only by the public, but to a greater or less extent, by the people in authority in governmental positions. This evening's talk, as it was advertised, was entitled "Holding Companies versus Owning Companies," indicating an attempt to classify holding companies by reason of their corporate powers and purposes.

## A Loosely Used Term

There is no differentiation possible, there is no classification possible by a mere examination of the parent company whereby one can call it holding or owning or investment company. The company, whatever you may choose to call it, in the last analysis, is nothing more nor less than a corporation organized for the purpose of investing in the securities of other corporations, sub-companies or subsidiaries, as they are called. An investment company makes its investment in that manner, an owning company owns the securities in that manner, a holding company acquires and holds the securities in that manner. Apparently the designation of "owning company." was to draw a line of distinction between a holding company that was subject to public disapproval and condemnation and an owning company, which was a good holding company.

Now, large manufacturing concerns, and large commercial and mercantile organizations, frequently organize in the separate states and in foreign countries, small subsidiary companies with moderate capitalization, simply to meet the condition of excessive and unreasonable taxation imposed as a franchise tax upon foreign corporations for the privilege of doing business within particular states or in foreign countries. Thus, for example, you have a franchise tax in Texas, and if a large corporation with twenty millions of capital engaged in a manufacturing business in New York State, wished to open a selling office in Galveston, Texas, it would be taxed upon the entire amount of its capital, although possibly at its Galveston office, there might be invested at most ten or fifteen thousand dollars.

To meet conditions of that sort, these large manufacturing, mercantile and industrial organizations have separate sub-companies to transact business in those states, and in foreign lands, to avoid excessive taxation. This does not convert those organizations into bona fide holding companies, nor are they owning companies, because the ownership of the shares of stock of sub-companies of that character is a mere incident to the primary and important business enterprise in which the parent or main company is engaged. With such companies, therefore, we have nothing to do this evening.

## Causes of Disfavor

It is holding companies that have a different purpose in mind with which public agitation is at present engaged, and with reference to which a few observations may be helpful and enlightening.

The great convenience which a holding company afforded for centralizing through stock ownership, the control, management and direction of the business policy of the sub-companies, caused holding companies early to recommend themselves to business men and financiers and to their legal advisors, as an ideal instrumentality. Probably the first notable example of the use of the holding company will be found in connection with the railroad development in this country, and one of the first important cases in which a holding company was brought to the attention of the court, was in the matter of the Northern Securities case. In that case, the first to attract general public attention, holding companies were condemned by the Supreme Court of the United States for the very obvious and natural reason that the holding company there was organized for the express purpose of dominating and controlling the business policy of two great parallel railway systems, the Northern Pacific and the Great Northern, and that after an attempt had been made by direct consolidation of those two companies, to accomplish the same result. The Supreme Court of the United States in a previous case had decided that such an amalgamation, merger or consolidation, was violative of the statute law of the State of Minnesota.

The holding companies' next and wide field of activity was in connection with industrial organizations, and through the unpleasant notoriety which holding companies obtained in the Tobacco, Steel, Standard Oil and the Bituminous Coal cases, general condemnation of holding companies followed. This was natural, because in the two fields to which so far we have made reference, the railroad world and the industrial world, the holding company did not invest in securities for the purpose of the direct profits to be made out of the ownership of the investments, but for the purpose of being able through the ownership of the controlling interest in sub-companies, to dictate the policy of the subsidiaries, to eliminate costly competition, to restrain trade and to monopolize a particular field of activity and enterprise.

The United States in the passage of the Sherman Law had declared that companies of that sort were contrary to the public policy of the Federal Government in the sphere of interstate commerce, where the laws of the United States are supreme.

## Laws Against Monopoly

Nearly every state by statutory enactment has declared an opposition on the part of the public to monopolies, and unreasonable restraints of trade. On the other hand, with the old English Common Law brought over by the first Colonists to our shores, we adopted the legal maxim that "monopolies are odious." The purposes which these holding companies sought to accomplish were in direct opposition to that which years of experience in industrial enterprise, in business fields and in railroad development had been found desirable and advantageous to the public, to wit: Untrammeled trade and unrestrained competition.

## Public Utilities Unique

When, however, you pass from the holding company and the purposes which it accomplishes in the railroad, industrial, manufacturing and commercial field, to the holding company of a public utility corporation, you find a very definite and marked distinction. This distinction is not born of a difference in corporate powers or purposes. It is born of the inherent difference between the subsidiaries owned, that is: Between a public utility corporation on the one, and a railroad or commercial corporation on the other hand After years and years of experimenting with a view to having competitive service in the public utility field, it has at last become universally recognized that a public utility is a natural monopoly, and that genuine competition between separate public utility corporations furnishing a similar service, is substantially impossible. Nay, it has been found that not only is it impossible, but by the very nature of the service rendered, it is most undesirable.

To illustrate that briefly—why have two gas plants with double the investment, each duplicating distribution pipe lines throughout a city, furnishing gas, one to this consumer and one to that, when with a single plant and a single distribution system manufacturing costs would be less, and interest charges on investment would be one-half?

That being so, a holding company that deals solely and exclusively with the securities of a public utility corporation that owns only the shares of stock in a public service company, cannot by any possibility do those things, accomplish those objects, be organized for those purposes which in the Tobacco, the Standard Oil, the Northern Security and the Bituminous Coal cases have been condemned. [The organization of holding companies of public utilities is not with a view, intent or purpose of acquiring or dictating control over subsidiaries for the purpose of eliminating competition, where competition by necessity cannot be, or controlling the extent of the service, when the only way to make profit is by enlarging the service, or reducing the public facilities, when only by winning the good will of the public and furthering the service rendered to them, a public utility can prosper and succeed.]

## Natural Monopoly

That these public utilities are natural monopolies is a matter of philosophical demonstration if you consider for a moment the services which they render. Originally water was invariably supplied by a public utility corporation. To-day it has very generally come to be regarded that inasmuch as water directly affects the health of the community, that therefore that is a public service which the municipalities should themselves perform, as the question of cost of service is negligible as compared with the importance of the service itself being absolutely perfect from the standpoint of protecting the public health.

When you pass to the street railway, it is practically performing a governmental function, because if communities are going to grow to such an extent that the ordinary method of travel whether for business or social reasons, from one section of the community to the other, is not practical except through the furnishing some new facility therefor, it should be the community's duty to furnish that facility, because it is the growth of the community that makes the service necessary. Experience has taught, however, that municipalities cannot perform these services, by reason of political conditions and otherwise, as effectually as it can be done by means of a private corporation, and by means of private capital. Consequently the municipality, through what is termed a franchise, gives to the utility corporation the privilege of performing that duty, and annexes to that franchise, whether it is written into the ordinance or not, by the very reason that it is a public service which is to be performed thereunder, the obligation that the service shall be adequate, that the service shall be safe, and that the charges for the service shall be reasonable. Such service is included in one general duty or obligation, consists of one service equally due to all members and hence should be uniformly performed by one instrumentality without discrimination, favor or partiality.

## Distinction Between Form and Purpose

Therefore, in the beginning, recognize exactly what the Legislative Committee at Washington manifestly begun to recognize the moment it started to draft the bills for eliminating holding companies, which in his message in January, President Wilson said must go, and that is, that there are holding companies, and holding companies; that the holding company that deals in a public utility is not the holding company that must go for it has no temptation to do those things which public opinion has condemned. You have seen ever since that message of President Wilson, repeated statements issuing from administration sources indicative of the fact that the earliest study and investigation of this question suggested to the administration and to the Congressmen who were on the Judicial Committee of the House, the necessity of drawing a sharp and distinct line between the holding companies whose purpose was to throttle commerce and restrain business, and the holding companies which dealt in public utilities and whose sole method of success and profit was by the upbuilding of the subsidiaries to the utmost limit of which they were capable and thus helping instead of injuring the communities served.

## Public Service Commissions

There is another reason why a holding company of a public utility cannot be guilty of any of the injuries, under any circumstances, which have been suffered through holding companies in the industrial and railroad field, and that is the fact that, performing as they do a public service, they are subject by necessity to public regulation and control. Thirty-one states and the District of Columbia have already passed laws giving more or less complete control over the regulation of the service and the rates of compensation to be received by public utility corporations for the services by them rendered.

Although this is true, it is a curious fact that when the statute of 1907 was passed in this State, creating the New York Public Service Commission, the feeling with reference to holding companies was such that in that Act there was written an express prohibition on a holding company acquiring more than ten per cent. of the capital stock of a public utility corporation operating within this State.

The State of Maryland, whose Statute is a substantial re-enactment of your New York Statute, followed this erroneous policy.

When Pennsylvania, in 1913, adopted its Public Service Commission Law, a general demand existed for copying, in this respect, the limitation on holding companies acquiring more than ten per cent. (10%) of operating public service corporations within the State of Pennsylvania, but the moment the advocates of this policy were confronted with the suggestion to cite a single case which had ever come before a court of law or a public service commission in which the ownership of the shares had been a factor or even a material point of consideration, or to cite a possible contingency in which the question of ownership of the shares could, by any possibility, restrict or limit the powers of the Public Service Commission to fully protect every interest, no matter how insignificant or negligible, of the public, it at once became apparent that the ownership of public utilities by a holding company could not be harmful, whilst many considerations and experiences cited, made such ownership advantageous and desirable.

Whenever the Legislature of the State of New York comes to consider the results of this restriction on the holding of public utilities shares by holding companies, you will find an amendment in this respect with reference to your own State.

## Public Utility "Holding" Companies

Passing now to the holding companies, which we are going particularly to discuss this evening, that is, these holding companies of public utilities, let us in the first instance consider all of the disadvantages that can possibly suggest themselves.

①The first, the readiest, the easiest charge to make is that these holding companies, like other holding companies, are often a means of excessive over-capitalization. It is difficult, of course, to conceive of any instrumentality, convenient in business, in commerce, or in any enterprise of any kind, character or description, which, in the hands of adroit people, is not capable of abuse, and I do not wish you to infer from anything that I may say to-night that there may not be some holding companies that have been guilty of excesses and abuses in the utilization of the powers which a holding company affords to the people organizing the same. But when the question of excessive capitalization is advanced, there are several things that immediately on examination, strike you. First, the securities which are offered to the public, for their purchase, in which their money is to be invested, are invariably the collateral trust bonds, the debentures or other prior obligations and the preferred stocks of the holding companies. The promoters of these organizations, the bankers who start them, the management and engineering organizations by whom they are conceived, are interested invariably in the ultimate equity or the common stock. Over-capitalization therefore means that if a loss is incurred, the very people who organized these companies and promote them, are, by necessity, the first losers. They organize these companies, and they retain for themselves these ultimate equities or common shares of the holding company, by reason of the fact that their observation and study of the public utility field has demonstrated to them that through the intelligent, effective management of an experienced, efficient organization of engineers, accountants, financiers and lawyers, such as a holding company attracts to itself, the returns of the separate utilities can be immeasurably increased through the improvement and extension of the public service rendered and that therefore their security, their investment in common stock, is not only safe, but is going to rapidly and continuously and uniformly enhance in value.

So far as I know, there is only one important holding company that really got into financial difficulties, even under the stress of the year 1913. An analysis of that particular holding company discloses the fact that it was not excessive capitalization which brought about this unfortunate condition, but the fact that the managers of that holding company departed from the legitimate field of investment, to wit, public utility securities, and embarked in irrigation projects, the results of which were quite different from what they anticipated when the investments were made, and it was the irrigation projects in which this company embarked that offer the explanation and disclose cause for its financial embarrassment.

## Automatic Protection

Second

Further, this capitalization of a holding company, in the last analysis, is with reference to a public utility holding company, very directly influenced and controlled by the capitalization of its several subsidiaries. This, by reason of the fact that the only way that the organizers of holding companies can continue to hold and to own the common stock in these companies is by insuring that the securities, the collateral trust bonds, debentures, notes or preferred stocks which are sold by them to the public, are sufficiently limited in amount so that the separate subsidiaries can contribute from their earnings in cash, sufficient funds with which to pay the interest and dividend charges on these prior securities. A failure so to do would either mature the collateral trust bonds, debentures or notes or cause the preferred stockholders to take themselves possession of the holding company, ousting the people who had organized it.

But the several subsidiaries, by reason of their constant growth, their insistent necessity for additional investment, never are able to distribute all of the earnings as they appear by their yearly balance sheets. A certain proportion of the percentage thereof, of necessity must be reinvested in the property, and therefore a direct limitation on the extent of the securities issued by a holding company which can pass to the public, results from the nature of its subsidiaries.

Where you do find an excessive capitalization in a holding company, I venture to say that in every case the fault is not with the holding company or its organization, but the fault is deeper than that, and lies in excessive capitalization of the subsidiaries which it owns. This excessive capitalization was brought about in most cases not as a matter of choice or design by these subsidiaries, but as a result of consolidations and amalgamations which were forced upon the subsidiary by the communities in which they were operating, allowing competitive franchises to be granted, competitive corporations to be organized, who only proceeded in competition to such extent as might be necessary to cause the original company in that field rendering the same or similar service, to realize the necessity of acquiring even at an excessive cost, its competitor, and in the resulting amalgamation, inflating the securities so as to cover the losses which in the competitive fight may have been incurred, and charging it against the public.

This criticism in its last analysis really goes back not to an over capitalization of the holding company, but to an over-capitalization in years gone by, of the subsidiaries which are taken into the holding company, a condition which with the existence of Public Service Commissions will not be repeated in the future.

## Analyzing Values

② It is further often said that the public are very likely to be misled and to misapprehend the character of the value of a holding company's securities. Personally, with only two years' training as a banker and twenty years' training as a lawyer, that seems to me an untenable suggestion and criticism. I have studied as a lawyer the balance sheets of railroads in connection with litigation, the balance sheets of independently operated public utility corporations, the balance sheets of industrial and manufacturing enterprises. I find that as great a system as the Pennsylvania Railroad, for example, starts out its asset column with its railroad systems, valued at so many dollars; running into hundreds of millions. I find that big manufacturing corporations figure real estate, plant, trade-marks and good will, at blank dollars, representing the bulk of their capitalization. I find when I look at an independently operated street railway balance sheet, its Railway system and franchises, valued at blank dollars. I find the same with the gas and the electric light company; and therefore, when you look at a public utility holding company's balance sheets, and you find the statement "Securities—blank dollars" you have got just as illuminating an index of the actual assets as you have when you look at the balance sheet of any independently operated company, with this qualification, that in the holding company you will nearly always find, and if you cannot find it, you can easily obtain it upon inquiry, just exactly what those securities are; the shares of what company, and the number of shares, the par value of the shares, and the percentage of all of the shares held of each particular subsidiary. And then you can analyze very simply, and just as easily as if it were an independently operated company, each separate subsidiary. As a matter of fact, however, the non-speculating public to-day is not misled with reference to investments, for the reason that investments to-day are made upon the advice of experts.

None of you gentlemen having a thousand dollars to invest would look over the morning paper to see what securities were dealt in on the Stock Exchange, and give an order to buy either a bond or ten shares of stock. You would consult with some banker familiar with investments, and would be guided by his advice. That people have been deceived with reference to holding companies, therefore, is not a reflection upon the holding companies. It is a reflection upon the fact that certain individuals have been willing to misrepresent holding companies just as hundreds of individuals have been willing to misrepresent railroads, industrials, mining ventures and other forms of enterprise, and just as human nature always will, when it is weak, when it is purchasable, misrepresent to a prospective investor a security, with a hope of profiting at his cost.

It is not a reflection, therefore, on a holding company of a public utility; it is a reflection upon certain, I apprehend, limited few people, who in this line of business as in others, are willing not strictly to adhere to the business honesty.

## Minority Stockholders

Passing from the question of over-capitalization, therefore, and the misleading of the public, in neither of which criticisms I feel you will find substantial merit, we pass to the criticism that holding companies do not always acquire all of the stock of the subsidiary, and as the result of acquiring only the majority, place the minority stockholders in such subsidiary at a great disadvantage. In part, this is a true criticism, in that the minority stockholder has a narrower market in which to dispose of his shareholding, which shareholding cannot have an important voice in directing the subsidiaries management and control, it being a minority. Nevertheless, this objection affects only the minority stockholder and is always of his own choosing, as the holding company acquiring control of any public service company is always willing on the same terms as that at which it acquires the majority to also take over the minority. The reason for this is manifest, differing from like situations in the commercial and industrial fields.

To illustrate: Suppose I am engaged in the manufacture of automobile tires. If I could get just fifty-one per cent. of the capital stock of all of the other manufacturers of tires, and by reason of my dominating control, advance the prices of all of the tires competitive with my own, I could make all of the profit out of my own company, and the minority stockholders in all of the other rubber tire companies would lose absolutely their entire investment. In a public utility corporation this is not possible, because if I reduce the revenues of a particular street railway or gas or electric company in which I have acquired a majority, I reduce my revenues, and reduce them more largely than I do that of the minority. I cannot have another street railway or gas or electric company in that same community, to which the business will pass, because there is only one public utility furnishing the same service, as you know, in practically every community. Therefore, inasmuch as the only way in which a holding company acquiring the majority of the stock of a utility company can make a profit for itself is by building up the value of the shares in which it has invested, and increasing the dividend returns upon those shares, it is always anxious to buy not a majority interest in a public utility, but the entire interest therein, and thus make the entire profit of its labors and if the minority stockholder is therefore at a disadvantage by having lost a wide market for his stock, it is invariably of his own choosing, in that he hoped that by remaining out, he could compel ultimately the holding company to pay him more for his minority stock than the holding company was willing to pay for all the stock.

But if he fail in his attempt to secure an excessive price for his minority stock, the only injury that he suffers is that there is a more limited market for disposing of the same. He participates ratably share for share with the holding company in all of the profits and earnings of the subsidiary. His stock is strengthened, is made more stable, and his returns are increased. Again, he represents the local investor, and in a matter as sensitive as public utilities are to public attack, the majority would never undertake to do those things which were harmful to him, for fear that through his intimate contact with the local community, he might develop local antagonism and ill-will, which would be more disastrous to the majority than to the minority stockholders.

## Relationship to Manufacturers

So that this objection is not serious. Another criticism that has frequently been advanced to holding companies, is—that there is a tendency ultimately of the holding companies producing a monopoly in the manufacturing field furnishing the supplies, plant, equipment and machinery that are used by public utility corporations. This criticism is on its face absurd. In the first place, public utilities are growing at such a rate that the manufacturing corporations who supply the equipment and plant which they require for their development, are hard put to it to secure the needed financing to take care of their own growing requirements.

There is invested over four hundred millions of dollars in new money a year in public utility companies. Approximately half of that goes to the manufacturers of the plants and supplies for these public utilities, and in order to enlarge their capacity, to take care of this growing demand for their output, they need a constantly increasing capital themselves. Consequently, there has been no tendency on the part of these manufacturing concerns to acquire any controlling or any important influence in the holding companies.

If, as a matter of fact, they did so, the Northern Securities Company case is definite assurance that the Sherman Act is broad enough to reach any such attempt, and that therefore it can be effectually dealt with.

## Policies of Management

④ The only other criticism which is made against holding companies is the fact that the management and engineering of a public utility from a central organization often remotely located from the community served by the utility has definite disadvantages, in that such an organization is out of touch with the local people and does not appreciate their temper or demands, and is not promptly responsive to their requirements, and that therefore often such subsidiaries are subjected to criticisms and an agonism by the public which, if they were locally held, operated and owned, would be avoided.

Theoretically that sounds very plausible. Actual experience has demonstrated that the reverse is the fact. And why? For the simple reason that holding companies realize the danger from this source, and therefore always pick for their local directorate and board, men of extraordinary and special standing in the local community. They do this so as to insure the good will of the local people on the one side, and to insure that inquiries which may be made from abroad or from distant points with reference to the integrity of the investments, may be answered always with cordial recommendation. These local men who constitute the directorate of these subsidiaries are men of such standing and character that if the corporation were not fair in its treatment of the public, if it were not efficient, if it did not furnish adequate service, if it were not up to date in its management, they could not afford to remain upon the board, because they, as the local directors, would be the people whom the local people would directly charge for their shortcoming.

## A Director's Experience

Within the past few months I had the opportunity of travelling through the distant West and stopping at one of the large central west cities, where the local lighting and street railway company was owned by a public utility holding company, and I was told by the owner of the largest department store that to be a director on that operating company was a source of real profit to him, because of the good will enjoyed, by the railroad and lighting company. But he added very promptly, "If ever the management should become narrow and less enlightened than it has been in the past, I should have to resign, because I know that the local people would charge me in part with the responsibility thereof and I would know that I would lose in my trade to my competitors." Therefore there is no special point in the actual operation, which militates against the supervisory management, control and direction of a holding company whose principal office may be far removed as it is bound to be located at some great financial centre.

When you come to consider the advantages of the holding company, which we will in a moment—I think this will impress itself upon you very forcibly.

## Income Tax

(3) The income tax adversely affects holding companies. The multiple taxation of earnings of subsidiaries, and then the taxation of it in the holding companies, is a burden which the holding company has to bear, but it is a burden which, as long as the tax is as small as it is, does not begin to outweigh the manifest advantage which come from the holding company's operation of its subsidiaries, and therefore, while its present form is to be regretted, and while it is perfectly evident that it was passed without apprehending the fact that it was attacking not only holding companies which were under disfavor, but holding companies which are admitted to be purely beneficial and should be encouraged, it is a burden which cannot be denied. If the Congress had stopped to read the famous case of Wilcox vs. The Consolidated Gas Company of New York City, they probably would have exempted holding companies dealing only in public utilities from this multiple tax, because they would have recog-

nized that it had been adjudicated by the Supreme Court of the United States that the proper characteristics of a public service corporation was that of a natural monopoly.

## A Supreme Court View

I am just going to read you a few lines from Justice Peckham's opinion referring to the New York Consolidated Gas Company. He says, "In an investment in a gas company such as complainant's, the risk is reduced almost to a minimum. It is a corporation which, in fact, as the court below remarks, monopolizes the gas service of the largest city in America, and is secure against competition under the circumstances in which it is placed, because it is a proposition almost unthinkable that the City of New York would, for the purposes of making competition, permit the streets of the city to be again torn up in order to allow the mains for another company to be laid all through them to supply gas which the present company can adequately supply, and so far as it is given us to look into the future, it seems as certain as anything of such a nature can be, that the demand for gas will increase, and at the reduced price, increase to a considerable extent, and interest in such a business is as near a safe and secure investment as can be imagined with regard to any private enterprise."

Although the Supreme Court thus characterized the investment in public utilities in the Wilcox case, now some years ago, it is only recently that the investor at large is really awakening to the fact that what Justice Peckham there said is absolutely true,—that, **first, competition as a source of danger is now almost unthinkable; second, that so far as it is given us to look into the future, it seems as certain as anything of such a nature can be, that the demand for gas—and he might have said any other public service—will steadily increase; and third, that an interest in such a business is as near a safe and secure investment as can be imagined with regard to any private enterprise.**

Turning now to the other side of holding companies—and if I have failed to mention any objection that occurs to any of you gentlemen as to holding companies, I would be glad to have you note them and question me in reference thereto at the conclusion of my remarks.

Those are all the objections which in my experience and study of the subject I have ever heard advanced, and therefore I am going to present to you now the other side of the picture.

## Helps Local Companies

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The advantages accruing to subsidiaries generally may be conveniently subdivided into three heads—those resulting (1) from operating, engineering and legal supervision, (2) those resulting from the Purchasing Department of the holding company, and (3) those resulting from the accounting and financial assistance received. *

[illegible]

Independent public service corporations being natural monopolies, as I have explained, and as Justice Peckham has decided in this celebrated Consolidated Gas Company case, lose the incentive to higher efficiency which, under competitive conditions, only spells success. Nothing tends to so promote efficiency, capacity, accuracy, system and method in the conduct of any business, as the keen, constant rubbing against a rival who is insistently endeavoring to reduce costs and improve value in order to secure increasing trade. With a natural monopoly, this incentive and desire to constantly improve conditions is absent.

## Vitalizing Influence

How does a holding company meet that situation? If you will go into an independently operated company that you know is about to be taken over by a holding company, and you will study the operations of that independently operated company, you will see invariably signs of extravagance, wastefulness, obsolete and archaic business methods, a service not measuring up to the best standards of operation and service. Immediately upon that company being taken over by a holding company, you will observe that in every detail of its management, there seems to be an awakening. Why? Because every holding company causes each and every subsidiary to make daily and weekly and monthly reports, the latter in great detail. These reports are, by their statistical department, tabulated. Within fifteen days after the first of the month, the manager, the operator, the local engineer, the local accountant, the local commercial man, of each and every subsidiary, is apprised exactly of the results accomplished by the corresponding department in other subsidiaries. Consequently, for actual competition, is substituted comparative competition, and the factor which is lost by reason of the public utility being a natural monopoly, is restored by the holding, but it is restored in a manifold form, because the comparisons are not with one or two competitors. The comparisons are with a dozen or twenty or thirty competitors, depending upon the size of the holding company and the extent of its ownership of subsidiaries. If the manager, the engineer, the operator, the accountant or the commercial man of any one of the subsidiaries of such a holding company is uniformly found with his record at the foot of the comparative list, he realizes without being told, that his days in that position are numbered, and therefore you are always getting, by reason of this comparative competition, in spite of the fact that the direction and supervision of the organization may be a thousand miles away, [illegible] the keenest and best results in every department of the public utility subsidiary in each and every one of the communities served through that holding company.

## Larger Incentive

Again, holding companies naturally attract to their subsidiaries the most talented, able, efficient and best qualified officials and operators. Why? Because nowhere is there the same future for an ambitious, energetic, forward-looking man. He knows that when his talents and abilities have been demonstrated in one subsidiary, that he is in line for promotion to a larger subsidiary just as soon as one of the other men fail. He realizes that ultimately if his work measures up to the best in that organization, he will be moved to the central organization, and become one of the directing members of the holding company itself. This opportunity for continued advancement is a direct incentive to the best work among the local men and tends to awaken initiative, enterprise and progressive ideas.

## Management by Specialists

Aside from this, the officers and the directors of holding companies are specialists in this field. They are not like the average officer or director of an independently operated public utility whose business affiliation and association with such a utility is an incident of some to him more important and pressing personal occupation or business. These holding companies always have as their officials and as the members of their executive committees, ~~always~~, and to a large extent of their directors, men whose lifework is the upbuilding and expansion and enlargement of the public service corporations. These men study everything that is being done by other holding companies, and the subsidiaries of such holding companies. They study what is being done in every independently operated company, and wherever the mark of a particular progress or a particular advance is made, they reach out their hand for the man, whoever he may be, though even his name may be unknown, who has originated the improvement, and invite him into their organization, where they can offer him a brighter future and larger compensation than he can ever hope to get with a public utility that is purely local and independent. Therefore, ~~of necessity~~, the organization of the subsidiaries themselves of these holding companies, is infinitely better in the service that they render to the public and in the service which they render to the company, and through the company to the holding company, than the corresponding service which will be found in the ordinary public utility. You understand when I say this, I do not mean to say that the operating man in a small town of 25,000 inhabitants is as good an engineer as the one employed by the Consolidated Gas Company or the New York Edison Co. I mean, comparatively speaking, a town of 25,000 inhabitants, with the public utility independently operated and locally owned, will have infinitely poorer service and an infinitely poorer management 999 times out of a thousand, than a city of the same size whose public utilities are owned by a holding company. That is a proposition I challenge anybody to disprove.

## Engineering Advantages

From the engineering standpoint, there are further and greater advantages. The engineers standardize designs and methods. These are adopted as each new subsidiary is acquired, as promptly as a due regard to enlightened economy will permit. Once established, these standard supplies and equipment required for the subsidiaries of a large holding company are ordered so frequently and in such volume that the manufacturers who produce the same carry them in stock. When the need for them, therefore, occurs, when an accident makes a hurried demand for them, there is a prompter and a readier service and delivery.

Aside from this, the engineering corps of a holding company, ever ready to serve any of its subsidiaries, is not called into the service of that subsidiary as an independent consulting engineer would be, but goes there equipped with all the capacity, all of the ability, all of the engineering experience which the consulting engineer could bring, and also with an intimate knowledge of local conditions and requirements, of probable growth and development, and therefore is capable of giving more promptly sound advice and recommendations and helpful co-operation. The service of the holding company's engineering corps is, therefore, infinitely better, more effective and more immediately available. It is also more economical, as the chance of errors of judgment and extravagant and unnecessary expenditures of money are eliminated. Such an engineering force is available for construction work, and new construction work is constantly going on in connection with these public utilities, but except in a city like New York or Chicago or Philadelphia, a locally independently owned public utility could not afford the expense of maintaining an adequate and competent staff of engineers to supervise and direct construction work and prepare the specifications and designs therefor.

## Lightening Calamity

When, however, the cost of these high grade engineers is distributed over a dozen or twenty subsidiaries, the cost which each one of them bears becomes negligible. In time of sudden calamity, such as was experienced during the 1913 floods in the Ohio Valley what is the situation of the subsidiaries owned by holding companies, as compared with the independently operated public utility corporations that suffer a like fate? First, an engineering staff adequate to all local requirements could be instantly furnished from the staff of the holding company or from the organizations of its other subsidiaries. The independently operated local public utility had to compete in the market for experts then in general demand. It had to select the best under the circumstances that it could get. And even then before these experts were capable of giving intelligent advice as to what ought to be done in order to meet the crisis which befell such independently operated company, time had to be lost while they were studying local conditions and requirements.

Not so with the subsidiaries of the holding company. The instant the calamity occurred, the engineers started out there with every important factor involved in the rehabilitation of the local plants and systems clearly outlined in their own mind, because they knew the community, its requirements and its former facilities. They knew exactly what was needed in order to restore in the least possible time, the service, and therefore it is in those towns where the holding companies own the local utilities, that the service is most promptly and completely restored with the least inconvenience to the community and at the minimum of cost to the local company, and the minimum expense, therefore, to the holding company.

## Legal Advantages

Aside from this, there are legal advantages. People who are not interested in and not intimately informed about public utilities can scarcely appreciate how valuable a really efficient legal department in a holding company can be to its subsidiaries. The American people are always fair when they understand, and many a case before a Public Service Commission or before a court, which has been decided adversely to a public utility corporation, and which has threatened the stability and integrity of its securities and earnings, has been due to the fact that there was a failure to present to the jury or to the court or the commission the just rights and the moral equities of the public utility company. A trained corps of counsel from the main office bring to the Public Service Commission or other tribunal before whom a hearing is being had, analogous decisions under like circumstances in other states, and also see that at least every pertinent fact which should be considered by such tribunal, in order to safeguard and protect the subsidiary, is plainly and forcibly and effectively placed before the court or commission, and thereby the danger of injury and loss to the subsidiary is provided against.

## Economy in Purchases

Every holding company of any magnitude either has a separate subsidiary which is engaged in the purchasing of the material, supplies, plant and equipment requisite for the operation of its public utility subsidiaries, or a department of the holding company that performs the same function as such equipment and supply company. Purchasing on a large scale the holding company buys more cheaply the construction, maintenance and operating machinery, material and supplies. This department has at its head a manager who is not a purchasing agent one day, an accountant the next and a general utility man the third, but whose exclusive attention is devoted to ascertaining the best market, the best manufacturers and the lowest prices quoted—all of which enure to the benefit of the subsidiaries.

The standardization in operating and engineering which has been alluded to, becomes an important factor in the securing of the lowest prices by the purchasing department, whilst the volume of its dealings, causes such purchasing department to keep in closer touch with current prices and the probable tendency of increasing or decreasing costs of particular materials and supplies, to meet which conditions often valuable contracts are made covering substantial periods of time.

## Great Financial Advantages

Public utility securities are, necessarily, local in character and, except in the larger cities, are salable only in their home markets. With this restricted market, the public utilities companies have been required to pay a higher rate of return than railroads, banks and large industrial companies in order to attract capital.

The holding company has broadened this market. It has given to the securities of its subsidiaries credit as being the obligations of companies whose securities had priority over the issues of the holding company itself, and, therefore, as being entitled to, without special investigation of the subsidiary, at least an equal confidence in their integrity and stability as that enjoyed by the security issues of the holding company.

Where the community served is so small that the issue required to provide the financing for the subsidiary is so limited that practicallly no market can be made therefor, the holding company, itself, acquires such issues, provides the financing through its own collateral trust bonds or debentures, or its preferred and common stock, which, being parts of large issues, have established for themselves a broad market and are, therefore, more salable. Thus, communities which, otherwise, would fail entirely of the benefits of such public service, secure the same through the instrumentality of the holding company's activities.

## Working Capital

Further than this holding companies always aim to maintain available a large working cash capital. With this, or through their credit in securing loans from metropolitan or local banks, they temporarily finance their subsidiaries or provide funds for carrying the securities of subsidiary companies until either market conditions for their sale improve and a better and more satisfactory price can be realized therefor, ~~or~~ Even when market conditions are good, nevertheless, they hold securities issued to provide funds for extensions, betterments, improvements and enlargements until the increased revenues and earnings resulting therefrom have established the larger margin of return available for the interest on such securities and thereby a more attractive price can be realized.

Further than this, in times of stress or calamity, such as visited the Middle West during the Flood period,the holding companies were able to come to the aid and rescue of their subsidiaries by furnishing them promptly with the necessary funds to rehabilitate their plants and reestablish their operations, thus causing a minimum of loss to the subsidiary and its holding company and a minimum of inconvenience and deprivation to the communities served, through the prompter, more effective and complete restoration of the public service. Hand in hand with the financial assistance thus extended, goes the uniform active supervision and audit of accounts of all subsidiaries, lending to them, in the various problems arising, the co-operation of the experienced expert accountants of the holding company.

From the larger experience had from the observation and study of the operations of many subsidiaries, uniform, safe and proper policies are established for providing depreciation, maintenance and other reserve funds, including, particularly in connection with street railways, adequate provision for the normal average of damage suits and personal injury losses.

Similarly, a systematic, intelligent and adequate insurance policy is pursued.

Most of these advantages, except those incident to the financial support which can be furnished by a holding company to its respective subsidiaries, are in a like measure furnished through management associations, but these do not supply, particularly in the financial field, the same elasticity and responsiveness as is secured by a holding company, although it is but fair to say that one of the most eminent operating and management organizations of this country has not generally resorted to the use of the holding company in the management of public utility companies under its direction.

## Safeguards Investment

A very definite disadvantage of a failure to centralize the ownership of the stocks of operating public utility companies in a holding company is that the failure so to do necessitates providing a market for the separate stock issues of each utility company. Substantially one-half of the capitalization of utility companies must be represented by preferred and common stocks and a market for these is essential; otherwise, the constant providing of moneys through the sale only of lien securities, such as mortgage bonds, will cause a condition discrediting the bond issue itself, through the absence of a substantial equity representing the ultimate ownership of the utility.

Within New York State and within the last year, as the result of rate hearings, you have seen the stock of two electric companies drop 25 per cent. to 30 per cent.; the dividends of one company cut 33⅓ per cent.; and the other entirely suspended, with consequent hardship to the investors in those securities. Needless to say, the normal growth of the community and the increasing revenues of these utilities, by an enlarged use of the public service will, in the very near future, restore those securities to their former market price and dividend-producing capacity. Had said securities, however, represented a fraction merely of the securities of a large holding company, the temporary embarrassment in their earning capacity would have been off-set by the normal growth in the revenues and dividends of the other subsidiaries and no like break in market values and returns would have been experienced by the holders of the obligations or preferred stocks of the holding company, and a much less drastic and marked effect would have even been experienced by the owners of the common stock of the holding company.

## How Risks are Averaged

To illustrate this, let us assume that an operating company, with outstanding bonds of a million dollars, and outstanding preferred and common stock of a half million, each, has net revenues, after paying operating expenses of $120,000. A public service commission ruling reducing rates and wiping out, say one-fourth of its earnings would cause the common stock to become immediately non-dividend paying. Let us assume, on the other hand, that the common stock of such an operating company, represented one-twentieth of the securities of a large holding company, from which it had been deriving $30,000 a year net revenue. If from each of the other nineteen companies, they had averaged the same rate of return, the total revenues of the holding company would have been $600,000, so that the temporary loss of the dividends of this one investment would represent in the gross earnings of the holding company a reduction of 5 per cent. in its net earnings, but, in view of the fact that the normal growth of public utilities properties of this country measured by the experience of the last decade has been from 5½ per cent. in street railways to 8 per cent. and 9 per cent. in electric light and gas companies, this loss in revenue would be more than off-set by the normal increase in returns from its other nineteen subsidiaries.

In other words, the holding company causes to be brought into operation the well-known law of averages. It increases the probability in respect of any one year, of having its earnings affected by adverse regulation. It decreases the seriousness of such adverse regulation, in that it is extremely improbable that it will happen in more than one or two properties in any given year and that the enhanced returns from the other subsidiaries not so affected, will more than compensate for the loss in the particular subsidiaries thus suffering from a temporary set back in the returns and dividends which they are able to earn and pay upon their ultimate equity held by the holding company.

### Compound Growth of Business

The U. S. Census reports show that the average growth of American cities is at a compound rate of approximately 2.85 per cent., which means approximately a doubling of population in every twenty-five years. Public service corporations' gross revenues, however, grow at a faster ratio than the population.

Statistics disclose, for example, that in a city of 10,000 population, the average consumption of gas, per capita, will be about 1,000 cubic feet, whereas, in cities of 250,000 population, the average per capita consumption will nearly approximate 5,000 cubic feet. This is due to the fact that the larger a community, the greater the aggregate amount of business and social intercourse and, therefore, the greater use made of the transportation facilities furnished by the street railway system and of the illuminating facilities furnished by electric light and gas companies.

Aside from this, invention is constantly suggesting and providing new uses for electrical energy and gas, both in commercial and domestic fields, so that, the gross revenues of these compaines are doubling at the rate of substantially once in every ten years, although the population's growth of the communities is materially less.

Those factors of safety and security of investments in public utilities securities generally including therein the issues of holding companies is illustrated clearly by the reports of the Comptroller of the Currency.

### Bonds Favored By Banks

The National Banks, as of June 30, 1911, had 10.9 per cent. of their investment holdings in public utility issues.

In 1912 it had reached 11.3 per cent. and in 1913 it had reached 13.4 per cent.

During the corresponding period of time, the holdings of these National Banks in railroad bonds had decreased from 30.4 per cent. to 28.3 per cent.

During the year ending June 30, 1913, National Banks increased their holdings of public utility investments $118,000,000, so that the aggregate of their investment, which was $603,000,000 on June 30, 1912, had become over $721,000,000 by June 30, 1913.

During the same period, these banks sold considerably over $100,000,000 of their railroad investments, and, as a result, the National Banks' holdings of railroad bonds, which amounted to $1,660,000,000 as of June 30, 1912, had decreased so as to amount, as of June 30, 1913, to $1,550,000,000.

The volume of investment in public utility corporations has, of recent years, grown phenomenally. Amid the good financial times of 1912, public utility corporations issued and marketed securities of an aggregate amount of $618,000,000. In spite of the depression and uncertain financial conditions of 1913, they marketed over $450,000,000 of securities, and it is safe to assume that substantially like amounts will be annually required, if public service corporations are to fully meet the reasonable and proper demands for adequate service at reasonable rates.

The reason that these funds have been procurable in the public utility field, becomes comprehensible when it is realized that taking the last thirty years as a basis of investigation, it will be found that during each of said years for every $100 of investment in the U. S. $1.93 of that invested in National Banks was either in the hands of receivers or in the course of voluntary liquidation; that $1.84 of every $100 invested in railroads was in receivers' hands and that of every $100 invested in industrials, $2.07 was in receivers' hands, while Gas and Electric Light and Power Companies had the unique record of only 37c. per $100 of invested capital being annually in the hands of receivers.

## Reasons for Investment Stability

A study of the last twelve years, comparing industrials, steam railroads and gas and electric properties, will show that, whilst the outstanding securities of all of these various business activities have enormously increased, the revenues of industrials have risen and fallen with violent fluctuations: that railroads have substantially a parallel experience, only less extreme, but that the gas and electric companies in the aggregate have had a uniform increase in the aggregate of their net earnings and that the rapidity of this increase subsequent to 1908 has been greater than during the period from 1902 to 1908.

During this same period of twelve years, whilst the average net return on railroad securities has fluctuated from a minimum of 3¾% to a maximum of 4½%, or with an average of 4¼%; and industrials have fluctuated from a minimum return of 5% to a maximum of 10% with an average of 7.79% that on gas and electric corporations, the annual return has only varied from 8¼% to 8¾% whilst the average return for each of the twelve years has been 8.45%, so that, during the last twelve-year period the investments in public utilities have shown:

1. Constantly increasing volume of gross and net earnings;
2. A narrower fluctuation from year to year in the per cent. of return on each $100 of invested money; and
3. A higher average of return for the whole period than either railroads or industrials.

Nineteen hundred and fourteen marks the first separate publication by John Moody of an analysis of investments in public utilities and industrials, and of the text of his book of 851 pages, 633 pages, or over 75 per cent. are devoted to the issues of public utility corporations.

It was not expected that I should be called upon to make these remarks until the latter half of April. I have not, therefore, been able to complete some of the investigations which I desired to make before addressing you on this subject; and I must, therefore, apologize for the absence of some data which I had hoped to be able to furnish you, in a clear, statistical form.

### Extension of Unified Operation

As illustrating, however, the extent to which holding companies have been extended and expanded, it might be mentioned that holding and management associations control electric central station plants in the United States in towns and cities of a population of over 1,000, in excess of 29 per cent.; and that holding companies controlled of the total street railways trackage of the U. S. 49.5 per cent. for the year 1912, the independent operating companies representing the remaining 50.5 per cent. In reaching this percentage it must be borne in mind that holding companies are not credited with the control of street railway trackage which constitutes part of a complete system, as, for example, the street railway system of Brooklyn, but only cases where a holding company owned railway systems situated in at least two or more entirely separated and distinct communities. There is every reason to believe that, if I had time to gather the statistics, a similar statement could be made with reference to the holding company control and the independently operated gas companies.

# Municipal Ownership of Public Utilities

### By Arthur Williams

## A Popular Misconception

The average non-property owning citizen seems to entertain the conviction, consciously or subconsciously, that his enjoyment of the various activities of the municipality in which he lives are paid for, largely, if not entirely, by others. For this one does not have to go far to find a reason. No bill is ever presented to him for municipal expenditure, and only by a difficult mental process can he realize that, after all, somewhere hidden in his food, clothing, rent and other expenditures he is really paying for them. Would it be strange, therefore, were he to accept the belief that other facilities, those falling within the class ordinarily designated as "public utilities," can be obtained on what seem the same modest terms, if only they are paid for through the public purse and conducted by public officials.

Such misconceptions are entertained very generally by our citizenship. Widespread opinion exists, or can be easily created, that things done under the direction of public officials are cheaper and better than if done by private individuals. Yet as a matter of fact there are probably few enterprises conducted by public officials from which the service could not be obtained more cheaply and efficiently under the methods prevailing in a properly conducted private corporation. That there are many departments of municipal service which should be administered by direct representatives of the people is freely admitted. In each instance, however, reasons, sentimental if not economic, can be found justifying the acceptance of this view, which do not apply to those conveniences or facilities falling within the public utility group.

## Two Groups of Public Utilities

Public facilities may be divided into two groups, with perhaps a "twilight zone" lying between. In the first are those activities which are admittedly general in their scope, such as the ownership of public buildings, highways and parks; the conduct of the police and fire departments; public school administration; sewers, street cleaning and the conduct of public charities. These services bear so close and immediate a relation to the individual, as well as the general welfare, it may be conceded almost universally that, in the interest of all, they should be conducted by the public itself. Yet excellent examples exist of the private ownership of highways and parks; private education is a very popular and satisfactory means of training the young; sewers are often owned privately, and our own city contains many examples of privately owned buildings occupied by public departments.

Within the second group, where the element of necessity to general as well as individual welfare is less marked, we find those utilities in which skillful conduct require long and continuous study and a very high degree of technical and managerial ability. Here will be found such utilities as the telephone, gas and electric services and the transportation of passengers and freight by steam and electricity. They constitute a character of service which is utilized by but a percentage of the citizenship; if publicly operated, the cost of serving the users falls upon users and non-users alike. Those who do not use the telephones should not be taxed for those who do; those using gas should not be taxed for those using electricity or oil or candles, and vice versa; those who do not travel, or travel but little, should not pay for those who travel extensively. Each service of this class is such that its entire cost should be borne by the user.

## Difficult to Find and Keep Trained Men in Public Service

In other than most exceptional instances men cannot be found to properly administer the conduct of this group through the accidental character of selection which prevails in the political service of the country. This is true of even the higher departments of the National Government. Individual ability such as that obtained in the construction of the Panama Canal and the great reclamation improvements of the West are often pointed to as indicating the incorrectness of this assertion. It is overlooked that the men who are so ably conducting these great works are free from political control, and have behind their personal qualifications of high executive and administrative order, years of continuous education and training in the military or naval service.

One of the reasons why municipal activities of a technical nature fail is found in the absence of this continuity of training and practical experience. When men of ability are found for the public service which is subject to political control, they receive usually an inadequate compensation, little or at best a fleeting public recognition and upon the first swing of the political pendulum they are turned out for others to take their places. The new incumbents may be men of equal ability and high character, but for a preliminary period they are without practical experience or intimate knowledge of their work and, again, as soon as sufficient time has passed to become acquainted with their work fault is found with their political faith and for this reason, and no other, they give way to new incumbents, who, also carefully selected, go through the same process of gradual development only to be turned out on the day when, throughout their entire period of service, they have risen to the highest state of public efficiency. Were any important branch of industry so conducted failure would be inevitable, as failure will always follow where the standards of one's fitness for and his permanency in office are political and not economic.

## Water

The supply of water may be placed in either group. Such considerations as the public health make imperative as the first consideration that an abundant supply of pure water to everyone shall be at all times available. It must be as common and free as the sunlight or the air we breathe. Even a non-user (were there one) would obtain both a direct and an indirect benefit, in being freed of the evil of a restricted supply of pure water.

Here again, however, it would be difficult to find an unvarying rule, for in New York City a private corporation furnishes pure water of a much more satisfactory quality and costing the consumer no more than the public supply. It is an economic, not a sentimental, nor necessarily a political question, and there are many like examples.

## Public Operation Undesirable

Experience has shown that when the utilities of the second group are operated by the Government the result, almost universally, is the exercise of a most undesirable and even dangerous form of political control and financial and service failure. Public service throttles personal initiative. The elimination of a personal interest and incentive takes away the most potent of all stimulus in rendering creative and progressive service. The average public worker has little or no prospect of promotion for efficiency and, if incompetent, little fear of dismissal. It is required only that his politics shall be of the proper brand. Public service is not a formidable taskmaster, where the inefficiency is not political.

## Graft and Corruption

Public operation of technical utilities provides innumerable opportunities for graft and corruption. It is almost invariably a struggle between political and economic considerations, and the former survive. Political pressure brought to bear by large bodies of employees has enormous influence upon those charged with the responsibilities of government. Politics and business should be absolutely divorced. Our civic interests are best served by having as few political employees as is consistent with the essentials of good government.

> *"Every government or municipal enterprise is exposed to political outbidding of one politician by another."
>
> *"Government employees become electoral factors, so much the more important in proportion to the increase of government and municipal activities. They become the actual masters of those to whom in theory they are subservient."
>
> *"In Great Britain the suppression of the vote of municipal employees has been demanded a number of times. In the Municipal Trading Report of 1900 I find the following declaration of Sir Thomas Hughes, twice Mayor of Liverpool:
>
> > 'The day on which a man becomes an employee of a municipal corporation he ought to have no further voice in the choice of his superiors.' "
>
> *"The suppression of the political and electoral rights of all employees of states and municipalities is an indispensable consequence of the development of public operation."

Let me quote from an editorial of the *New York World* of last Saturday, a paper which cannot be said to favor the private corporations or to be antagonistic to any of the best interests of labor. Under a heading entitled "Our Despots of Democracy," the *World* said:

> "Nominally the Civil Service employees of New York are public servants. In reality they are public masters.

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*Where and Why Public Ownership Has Failed*, by Yves Guyot, The Macmillan Company, 1914.

"The Mayor's police bills are on the edge of defeat not because of Tammany's hostility or because of the indifference of the Republican machine. These are obstacles that could be overcome. *It is the cohesive power of the Civil Service organizations which has cowed the Legislature.*

"In its fight against the Mitchel bills the Police System has not stood alone or been forced to rely upon the support of those who profit from its peculiar practices. It has been able to command the assistance of a great army of Civil Service employees, not only here, but throughout the State. Whenever it is a question of public servants being compelled to do their work and submit to discipline, this army fights as a unit. * * *

"The original Civil Service laws were enacted to protect faithful public servants from political bosses and safeguard the public business from the demoralization of party warfare. We have protected all these employees from the boss, but we have yet to devise means to protect the public from its employees.

"* * * No corporation would dare take the aggressive stand against public regulation that these Civil Service employees take. * * * It is practically impossible to bring them to account. They do their work as they please; they cannot be voted out of office. Attempts to remove them are frustrated in the courts. Legislatures are afraid of their organized and united political strength, and New York meekly submits to be ruled by them while it pays the bills.

"New York has a written charter, but it is only a matter of form. The real charter of New York is to be found in the decrees of 60,000 and more Civil Service employees, all organized against their employers, the people of New York. They are the despots of our democracy."

## Some Examples—North Carolina

This country happily possesses but few glaring examples of inefficient public utility service, for, with a few exceptions, municipal ownership on a large scale is yet untried. However, we are not wholly inexperienced. The State of North Carolina operated a railroad for nearly half a century. During this time the service was restricted and unsatisfactory and dividends were never earned. The first year of private operation found roadbed and equipment improved to a condition never before approached with the service for passengers and freight nearly doubled.

## Texas

The experience of Texas with her State owned railroad has been equally costly and unsatisfactory and the railway will pass to private operation as soon as a buyer can be found. The road has never earned its operating expenses. Between January, 1911, and August, 1913, the State lost more than $80,000, according to the Governor's special message to last year's Legislature.

## Panama

It would seem that the Panama Railroad, conducted under as ideal conditions as can ever be expected in the public operation of any utility, would offer an excellent example of efficiency and public convenience. Yet the official reports show that the operating cost has been nearly seven times higher than the corresponding cost of other roads privately conducted The absolute disregard of time-tables, the arbitrary taking off of trains and the limiting of passenger and freight facilities, have been frequently noted in the daily press.

## Canada

The Canadian Government examining the National Trans-Continental Railway recently found that more than $40,000,000 had been needlessly thrown away. The original cost estimate for about 1,300 miles was $61,416,000. More than $109,000,000 have been spent, and the Engineer-in-Chief estimates that exclusive of interest, the eventual cost will be $161,300,000. The investigating committee found that large sums were unduly made in sub-letting and that the tenders restricted the bidding to a favored few—eleven firms "making" about $9,000,000 without doing a stroke of work.

## Government Ownership in France

For examples of public railway operation on a large scale we must turn to other countries. Thus the deficits are steadily increasing in the operation of the French State railroads. That of 1909 was $7,500,000; of 1910, $11,200,000; of 1911, $13,300,000; of 1912, $14,600,000, and in 1913 it amounted to $16,600,000. In the operation of 5,500 miles of road the total for five years was $63,000,000. Special appropriations for improvements for the years 1909 to 1913, inclusive, amounted to $138,600,000. Notwithstanding these expenditures for property and this great loss in operation, the service is very unsatisfactory. Accidents have been frequent, time-tables are ignored and the operating officials and employees regard the traveling public with extreme indifference.

## The German Railroads

Take as another illustration the widely advertised State railways of Germany. German railways service is superior to that of France, but is inferior compared with the average railroad service of this country. The relative passenger and freight rates are higher. Overlooking the undesirable creation of a great public debt, and the absolute control of the country's transportation, giving the government an impregnable position of suppression and oppression over any political tendencies or actions of the people, take alone the economic result to the people, individually and collectively.

During the year 1910 the result of operating the Prussian Railways was a clear profit of only $57,000,000. In the following year the American Railways paid in the form of taxes alone $110,000,000. Owing to many uncertain elements, direct comparisons are difficult, if not impossible, but the statement of these elementary facts is at least a guide in forming an opinion as to the relative economic advantage of the two methods of obtaining national transportation.

This illustration is probably the best that can be found of government railway operation anywhere in the world. It seems clear that from any standpoint the individual and the collective interests of the empire are not as well conserved as were this vast system of transportation privately operated (though publicly regulated) and conducted under that character of private management which is characteristic of the great German industries. If Germany with its advanced and highly developed public service can offer in the conduct of its railroads no substantial advantage over private ownership and management, it would be difficult to find justification anywhere, other than as appealing to a political regime seeking to protect itself and perpetuate its existence or to a political party seeking office, which would justify a radical change from our American to these foreign methods.

## The Public Should Control, Not Operate

The present agitation for public ownership of railroads in this country leans heavily upon two recent examples of bad management. Were these instances normal and indications of the inevitable result of private ownership there would not be much to say. The general public is entitled to good service at fair prices, and a stock owning public to a proper degree of protection in its investments. These instances, however, offer an example of the fact that the public possesses adequate remedies for the cure of corporate wrongs, other than the purchase of or investment in and the operation of our various utilities, whatever they may be. Close students of the problems involved in our commercial development seem to find in the public regulation of our various utilities far greater safeguarding of their interests than the public ownership which has been so disastrous to the public interest in Europe.

> *"When political or administrative bodies, whether states or municipalities, operate, they are regulating themselves. This is sufficient reason in itself for the suppression of all public trading operations, because it is necessary that there be a distinct separation between the forces of operation and regulation.
>
> "Industrial operation is inherently adopted to private enterprise. Industrial control is the corresponding function of states and municipalities."

## Publicly Operated Telephones

Every European traveler is familiar with the inconvenience and utter inadequacy of the telephone service in every country of Europe where where it is publicly owned and operated. Take the city of Paris as a characteristic example. It is almost impossible to carry on an ordinary, short conversation from hotel to hotel without many interruptions and the most extreme indifference on the part of the officials. A personal experience, unusual only in the number of the preceding calls having right of way, was found in recently telephoning from the centre of Paris

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*Where and Why Public Ownership Has Failed*, by Yves Guyot, The Macmillan Company, 1914.

to one of the suburbs, not farther away than the City of Yonkers from the central part of Manhattan Island. After perhaps fifteen minutes of waiting, upon a call made before ten o'clock in the morning, the indifferent reply of the official was that the call was number 56 on the list and might possibly be reached at two o'clock in the afternoon. The telephone service of London is better than that of Paris, but it is infinitely worse than the telephone service of New York City in the days of its earliest infancy.

There has been recently published a booklet of thirty-two pages entitled "What the English People Think of Their National Telephone," composed entirely of complaining letters addressed to and published by the *Times*, of London, during the single month of December, 1913. Imagine anyone collecting thirty-two pages of complaining letters published in one of our leading metropolitan journals during a single month. If relating to a private service, how long would the corporation endure? But as the service is of a public nature, conducted by one group of officials, how can it be regulated by another group of officials actuated and controlled by the same methods or placed or held in office by the same appointing power. What chance has the ordinary citizen against a combination so perfect as this in even so essential a modern necessity as the telephone in the conduct of his business?

## Municipal Telephone Operation Costs More

Some may think that this indifference and inadequacy of service are justified by low cost. It has been estimated that the average annual cost of a telephone in this country is slightly over $30. Compare with this figure the average cost in the various countries of Europe based upon the latest obtainable reports and taking into consideration the relative wage earnings of the industrial workers of those countries. In Switzerland and the Netherlands the rates average about 33 per cent. more than in this country; in Sweden, Denmark and Norway, about 100 per cent. more; in Great Britain and Germany, 120 per cent.; in Russia, 150 per cent. and in France, 200 per cent. more than in this country. In all, excepting to a limited degree in Sweden, the service bears no comparison either in extent or high character with that to be obtained in this country, such as has been the result of good management, splendid personal and collective initiative and a high conception of a corporation's obligations in the service of the public.

## Municipal Ownership Usually Hastily Undertaken

As a rule, municipalities rush into the ownership of public utilities without fair consideration preliminary to their action. Municipal ownership campaigns are usually started at times of unusual public agitation—often created for the purpose—and some accident is seized upon by office-holding politicians—actual or prospective—and the measure is carried on a wave of popular excitement. We are without an instance of careful unbiased preliminary study where it has not been found more desirable to retain private rather than municipal service in the fields covered by this second group of public utilities.

## English Traction Lines

The advocates of municipal ownership when basing their arguments upon the public operation of the traction lines of England fail to state that during the few years immediately preceding the expiration of the former horse traction franchises practically all of the municipalities refused to give any extension of life to older methods or to grant new rights for the operation of electric lines than just coming into the public service. Thus with the approaching expiration of the franchise and the probable loss of equipment the owners invested as little new capital and spent as little for improvements as possible; consequently the general average fell below the normal service standards of the time. This condition worked both ways. It compelled, from an economic standpoint, the transportation companies to greatly curtail or entirely cease extension or improvement; to compensate labor with the closest and doubtless an improper degree of economy; to prune expenditure at every possible point in their desire to protect their capital against encroachment at the time of dissolution. In this situation they created an unusual degree of public hostility, on the one hand, and greatly added to the contentions of political agitators on the other. The beginning of this movement in England was not economic and has never been and cannot be justified from any purely economic standpoint. It was political, and has resulted in creating a great army of employees dependent upon the public purse and establishing an overwhelming burden of municipal debt. When approaching elections the English papers have repeatedly referred to the great pressure brought to bear upon those holding or about to hold office by these bodies of municipal employees, possessing controlling political strength, to secure any desired end, whether the extension of their activities, favoring legislation regarding employment, the limiting of hours or increased compensation.

## Glasgow's Tramways

The City of Glasgow has been held up as one of the most efficient examples to be found anywhere in the operation of street car lines. The service of these tramways is excellent, but not as good as our own. The mileage of the service is approximately half of such cities as Boston and Brooklyn, where the population may be compared with Glasgow. The investment of the public money in the tramways is $17,500,000. The average fare, paid on the "zone" system, is between three and four American cents, which, owing to transfers, is approximately the rate charged in the two American cities to which reference has been made. Those living in the suburbs, however, pay in the extreme, twice the American fare for corresponding service. The wages of the working classes average approximately half our American wages, so that the relative difference in the cost of the service is still greater.

Judged from the standpoint of profits, or alleged profits, the comparison is even more in favor of our American methods. Thus the contribution of the tram systems of Glasgow in the form of taxes average about 35 cents annually per capita, while in Boston and in Brooklyn the average tax contribution is much in excess of $1 per capita, or more than three times Glasgow's tramway contribution to the cost of conducting the affairs of the city.

Many, however, as are these disadvantages, they pass into comparative insignificance when considered with some attendant features of municipal ownership in that city. One result is a frightful congestion in the workmen's districts. More than half, or, to be exact, 53.6 per cent. of the entire population live more than two in one room. Last summer, though forbidden by municipal ordinances, seven people were found living in one room. This congestion results in a cost of cleaning the alleys alone—an operation entirely independent of the cleaning of the streets —of approximately 45 cents per capita, or 7 cents more than the tram "profits." Smallpox is a disease which is frequently caused by overcrowding human beings amidst filthy surroundings. Glasgow contains two smallpox hospitals, one having been found insufficient. An American corporation, carrying passengers on a low average fare with frequent transfers, and the usual liberality in making extensions to the suburbs, would soon create a new Glasgow.

Visiting officials telling our American commonwealths how to conduct their affairs, or the muck-raking writers of our magazines, using this municipality as an example, can truthfully find no feature in its administration or conditions of filth, congestion, hardship and awful degradation which anyone could rightfully wish to inflict upon any of his countrymen.

## Municipal Gas in Philadelphia

The former municipal gas plant in Philadelphia has been discarded for some years, and the lessons it taught have been largely forgotten. Some of the advocates of municipal ownership claimed that by taking public service utilities from private and placing them under public control, the payment of "graft" and existence of undue influences in our public affairs would be largely, if not entirely, eliminated. Yet the admitted condition existing as a result of the operations of the old "gas ring" of Philadelphia showed that the control and management of a great municipal undertaking of this character, largely affecting the interests of the people, on the one hand, and controlling politically a great body of municipal employees, on the other, carried a power for graft and wrongdoing of which no privately owned corporation of this country has ever been guilty. Under municipal ownership the prices were high, the service was poor, extensions were most inadequate to meet the needs of the public, and in the last year of operation the deficit approximated $400,000. The whole thing became so noxious that after years of effort the people of the city were able to break the ring and to substitute private for public operation of this property. The result has been service of the highest attainable standards, a degree of adequacy and of extension which has met the fullest demands of the public, a series of reductions in price, and, instead of an annual deficit of $400,000, an annual income for the relief of taxes in general, which for the year 1912 amounted to $1,369,966.

## Chicago's Municipal Plant

The City of Chicago conducts a municipal plant for the illumination of her highways. As perhaps the best practicable indictment of the method, for a great deal of mis-statement and misrepresentation upon the subject has been recently made in this State, it is suggested that any one visiting that city compare the street lighting standards with those of Philadelphia, Boston or New York or any of our larger cities where the service is purchased by the municipality from private sources of supply. That Chicago's plant subjected the city to a loss of nearly $225,000 in 1911, my last year of available information, is the least important of the indictments to be found against the system.

## New York's Experiment

Our own city a few years ago undertook the construction of a municipal lighting plant for one of the bridges and some adjacent city property. As a result of a comparative study originated by the officials of the City it was found the service of the private corporation was more satisfactory and cheaper and after a loss of $108,933.32, as reported by the experts, the municipal project was abandoned in favor of a private corporation.

## Municipal Ferries of New York

For a long time the Municipal Ferries of New York City were held up to the public view as splendid examples of efficiency and economy in Municipal Ownership. An investigation, however, showed that these ferries, instead of operating at large profit were conducted at an annual loss of about $1,000,000. For several years the annual deficit exceeded the entire tax returns from the Borough of Richmond. The figures were carefully compiled from official documents and the *City Record* and have since been confirmed by one of the city's fiscal departments.

The beginning of this unfortunate municipal venture was like that of the municipal ownership of trams and electric light in England. The ferries were operated under a limited franchise. As the time for expiration approached the City refused to give an extension. In consequence the corporation did not feel justified in investing large sums in a definite uncertainty, resulting in a lowering of service standards and other forms of curtailment which created an active hostility in the public mind. Though the operating company and several others offered, with an extension of the franchise, to include city representation in the Board of Directors, to provide large additional sums for the purchase of new boats, reconstructing terminals and improving the service in general, the offer was refused and the city took over the renewal of the terminals, the construction of new boats and the actual operation of the ferries.

Is it possible to conceive how this large sum of money, provided from general taxation, is of any moral or civic advantage to anyone? Even those living on Staten Island and using the ferries would find it difficult to see any advantages in relative mis-management, waste and inefficiency by which every citizen of the greater city is taxed in part to pay for his or her transportation to and from that Borough. Now the investment is threatened with large depreciation and a greatly increased deficit through the construction of a subway across the Narrows to Staten Island.

### Municipal Failures in General

Beginning with the instance to which reference has just been made, no less than 211 examples of municipal lighting plants exist, each carefully verified, in which municipal ownership or, its near equivalent, municipal operation have been abandoned. This statement is made upon detailed information secured in every case from the Mayor's, the Town Clerk's or other city officials of each municipality in which the abandonment of public and the substitution of private service has taken place.

### The Broader Question

Notwithstanding the long list of municipal ownership operations abandoned or creating annual deficits, it has seemed that these are the least important of the disadvantages to which the municipality is subjected in undertakings of this kind. As bearing upon this point, take as a concrete example the municipal lighting plant of the city of South Norwalk, Conn. Here we have an enterprise conducted through a long series of years by an upright, able and unselfish group of citizens, who in turn have given united and enlightened support to management as capable and well informed and as free from political influences as can be found anywhere. It is probably the best example of municipal ownership in existence. Nevertheless, without reference to relative costs, profits or deficits, in the attendant circumstances the operation of this plant has undoubtedly been an economic and civic error.

For many years the city has been in natural line for large industrial development and growth in population. These call for a kind of expenditure in public improvements for which capital of a private nature cannot be secured. Yet a large part of the financial resources of the city have been tied up in this electrical undertaking; to this has been added the unselfish activities of some of her most prominent citizens. Capital in money and human effort have been locked up in an undertaking which could have been at least equally well provided for and conducted by private agencies and consequently a more general civic development has been retarded.

The city claims a plant valued at about $200,000 "which has cost it nothing." Even so (overlooking the evident fallacy of the statement), it has cost the taking of an intelligent interest from other civic matters which, if released, could have been devoted to purposes which would have made the city famed for more than its possession of an electric light plant, in itself no different from the possession of any other municipality with which South Norwalk must constantly compete for an increase of citizenship and the enhancement of her industries.

Take a single item from the recent annual report, the statement that for a period of at least two years there has been a repression of any extension of the plant or distributing system, to the disadvantage of her citizens. Does this not mean an inertness of the large amount of capital which expended, in addition to rendering a needed service, would have enhanced to that extent the industrial activities of the municipality? In 1912 this municipality spent $3,000 for improvements, compared with a private corporation expenditure of $50,000 for extending and improving the electric light service in a nearby city of hardly twice the population.

Practically it would seem that in South Norwalk the real enemies of the municipality were its own citizens, conducting this closely restricted electrical enterprise, and that the friend of the people was the nearby private corporation providing a widespread and adequate service and a local industrial activity within the year of $50,000.

Contention has been made that the municipal plant gave cheaper service than had the supply been from a private corporation. Yet the public lighting under municipal ownership was accomplished at a per capita cost of 75 cents, while the cost in the neighboring city to which reference has been made was 50 cents per capita.

South Norwalk lies upon the main line of a great railroad system. It is but a comparatively short distance from New York. It has the further advantage of being on tidewater, with good docking facilities. It could have been and can still be made a great industrial center. Clearly it possesses all the essential elements of a great municipality, even greater than Bridgeport, New Haven or Hartford, and yet with all of these natural advantages its present population is relatively most limited. Does this not suggest that something has been left undone and that the advantages of possessing a plant, locally valued at $200,000, fade into insignificance in comparison with the unutilized opportunities which the same character of activities in other directions would have brought to this locality.

Had the same efforts been expended in advertising the city's natural advantages, in promoting local industries and commerce, and in providing adequate terminals and dockage, any advantage claimed from the operation of this plant would be far exceeded. Look at the matter from another angle, which also involves seemingly some fundamental principles. Suppose "outsiders" had been permitted to invest their money in the plant and to make a fair profit upon it, what would have been the result? Having their capital invested locally, would they not have been interested in bringing other industries to the city, with great mutual advantage? Is it not natural that possessing property there every effort would be exerted by them to increase the material prosperity of that community? Could investors in the public utilities of competitive cities be expected to place their business in a city where they possessed no attendant interests?

Were it asked how the interests of the city in question might best be served, the answer would be the immediate transfer of its far-famed electric lighting plant, with a proper franchise, to private capital and enterprise. A statement should then follow that the city had gone out of competitive business of an essentially private nature and that the securities in the undertaking were privately held and widely distributed, as much for the benefit of those residing elsewhere as for the local citizens having the securities in its possession. The next step in securing material prosperity would be the announcement that the city would welcome cordially any manufacturer who would provide work for the existing and a large prospective increase in population, under safe and sanitary conditions, just treatment in the event of industrial accident or illness and fair compensation; that manufacturers of this type would find a municipal corporation alive to every proper interest, providing adequate terminal and dockage facilities, parks, playgrounds and clean streets, and every possible industrial assistance in the common interest. The practical affairs of a municipality should be conducted no differently from those of any other corporation, ably and honestly managed, seeking to maintain the highest living ideals in a community where men and women and their children work, live and play.

## Private Corporations Pay for Their Facilities

All here are familiar doubtless with the statement frequently made that in permitting utility corporations to occupy the streets the public has parted with something it owns without fair compensation. The clear intent of this kind of agitation is to imply that the corporation has "deliberately robbed" the public and that it has obtained for nothing something of great value. The difference between a private corporation operating with and without a franchise is merely a difference in the character of the occupancy of the public highways. Speaking simply, it is the ordinary relation of landlord and tenant. The rights relate only to this question of occupancy. The highways of a municipality are owned by all of the people of that municipality. They have been made and are maintained at the common expense. When occupied it is proper, as with any tenant, that an adequate return upon the value of the occupancy should be made, this taking various forms of taxation. The landlord, the people of the community are in the fortunate position of being able to fix their own rent from time to time, and the tenant, the utility corporation, is unable to do other than protest, so long as the courts find that the rental terms are not unfair or confiscatory. The people have not given to and the corporations do not own the streets. They merely occupy them for the purpose of rendering service to the public, and for that occupancy they must pay what the owners decide to be a fair payment under the conditions.

There is no suggestion of opposition to the present tendencies of limiting the definite term of the franchise, rather than giving it perpetuity, as was largely the former practice. In the interest of the public, however, the change would be rather of form than of principle, for it is to the interest of no one, acting either as a public or private landlord, to have a tenant insecure in his tenancy, afraid to make adequate improvements or new investments or to be subjected to constant change and financial loss. The rules of tenancy are economic, not political, and are as true in one instance as in the other.

## The Landlord in Business

Simply because the municipality owns the highways and the right of their permanent occupancy for utility purposes is no reason why it should engage directly in conducting such business upon them as may be necessary for the common good. No more justification lies in such an action on the part of a municipality than with any other landlord having a good and responsible tenant. Strange as it may seem, there is no assurance that a landlord can conduct a business as well or as profitably as his tenant, or if he were envious of the profits of his tenant that he himself could make equal profit in the same undertaking. This is another simple rule which, in theory and practice, seems to apply with equal force to the public and to the private landlord.

## Public Service Commissions

It is to the interest of the consumer and, therefore, of the public that a service utility shall be as large and adequate as practicable and conducted with the utmost regard to economy in the interest of low prices and fair profits. These conditions mean that each of the utilities serves the public best when it is considered as a natural monopoly. Thus in telephoning it is to the interest of everyone to have a single system covering not only every subscriber in the community, but the entire country as well. The same is true of gas and electricity, for with extended service, plants and distributing systems can be built of greater capacity, resulting in safer and more adequate supply and large manufacturing economies. Single ownership of local traction lines means liberal transfers, so that no one, particularly the industrial worker, need find a residence bearing any special relation to the place of work, so far as transit facilities are concerned. While there may be and doubtless are many objections to any common ownership of our system of railways, yet the most violent agitator would hardly wish to go back to the times when one was compelled to make a half or a full dozen changes between New York and Chicago. All this means a kind of monopoly—as objectionable as the word itself sounds—which we may term a "natural monopoly," for it is not only in the technical and managerial interest of the utility itself, but directly in the interest of the people, individually and collectively, which the utility is designed to serve. Many accepting these views upon the question of monopoly, fearful, however, of the power their management might give into the hands of a few men felt that the only alternative was their ownership and operation by the public. We have seen bad examples cited, to which additions could be made in practically unlimited degree, that abuses which municipal ownership has sought to correct have been followed by still greater and more serious abuses and that the underlying principles are dangerous to our institutions and entirely uneconomic.

An alternative is now on trial in this country, thus far with promising results of ultimate success. This is the Public Service Commission. Commissions now exist in 45 of our states, and in all of the others there are legal bodies possessing varying degree of regulatory power through which in every practical sense the people at large are entering into all questions of investment, operation and price. Instead of public ownership and operation the safe and economic method should be private ownership and operation accompanied by public regulation.

## In Conclusion

It is to be greatly hoped that our country, in its National, State and Municipal policies, will not adopt European methods which have been found to be mostly destructive of the best in public and private life, but rather will continue a course in which our great utility industries will be absolutely divorced from politics; that they will continue to give the largest incentive to individual and collective advancement; that our people may secure at lowest cost the best which science and invention have developed an placed at our service for bettering conditions in human life.

# Progress of the Science of Lighting

### By Dr. Edward P. Hyde

It is a great pleasure to have an opportunity of addressing this Forum to night on the progress of the science of lighting. Mr. Franklin, the presiding officer, is not to blame that he does not know that I do not profess to be an expert on electric lamps particularly, but rather as an advocate, if you will, of the development of the science of lighting. I am sorry—very sorry for your sakes, that you will not have the pleasure of hearing Mr. J. Robert Crouse speak on the Industrial Developments in Electricity, or, as I think he intended to speak more specifically, on the work of the Society for Electrical Development. You have missed a great stimulation by not hearing Mr. Crouse speak.

In his absence, perhaps, I may be permitted by way of introduction to say a few words on the subject on which Mr. Crouse was to have spoken, following the illustrious example of that eminent Forum speaker, Joseph Cook, who, as some of you know, was accustomed to address large audiences in Tremont Temple, Boston, on various subjects having to do with the relation of science and religion, and who prefaced his lectures by preludes on topics of the day, no matter over what ground they extended. Like Dr. Cook, perhaps I might be permitted to prelude what I intend to say regarding the subject about which I know little, by a few remarks on a subject about which I know less. (Laughter.)

## All Lighting Electrical in Ultimate Analysis

I would refrain from what I am going to say if Mr. Crouse were here, for two reasons. In the first place, he would be talking on the subject instead of me, and, in the second place, I should not like to give him the benefit of the arguments that I would propose, in addition to those very excellent and convincing arguments which he has himself, regarding the importance of electricity, in competitive business between electricity and gas. I should not tell him these things because he already thinks too much about the importance of electricity, but perhaps no one will tell him if I should say a word or two regarding the electrical side, because what I prepared this evening will have more to do with the science of lighting apart from any connection with electricity or gas. But don't you know that, after all, when you come to the real science of lighting, it is all electrical? It is all electrical because light itself is an electromagnetic phenomenon, and I often taunt my gas friends, of whom I have many, with the fact that try as hard as they will, they cannot get away from the fact that gas lighting in its ultimate analysis, is electrical.

And then there is another argument which comes home quite close, I think, to those of you who live in New York. I recall once hearing a very well known gas man at a dinner, at which he and I were sitting side by side, expounding the great possibilities of the development of gas lighting, and he referred to the recent construction here in New York at Astoria of the new magnificent gas plant. He thought he had made quite a hit. I happened to have the good fortune to follow him, and after saying what other things I had to say, I turned to him and continued that no doubt gas lighting was developing with rapid strides, but I noticed one thing, and that was that the gas companies in building great plants for the future, always had an eye to the winward, and that when the Consolidated Gas Company of New York built that magnificent new gas plant at Astoria, they put it pretty close to Hell Gate, so in case there was no more need for gas here, they could shunt it off to a place where electricity did not compete. That is all I have to say, gentlemen, about the Society for Electrical Development.

## The Progress of the Science of Lighting

One of the very live problems that confronts the American commonwealth at the present time is that of public vs. private ownership. This problem has reached the acute stage in regard to public utilities, and there are not a few who either look forward as to an ultimate Utopia, to the time when all private corporations shall be outlawed, and the regime of twopenny merchants with halfpenny brains shall once more obtain, or else anticipate joyfully the day when the people as a whole, through the medium of organized government, either by purchase or by the more vigorous methods of the syndicalist, shall take over the ownership and management of those large industrial corporations already brought to the high state of perfected development through private enterprise and the investment of private wealth.

The topic on which I shall speak to-night is "The Progress of the Science of Lighting." It is scientific, and not political, or even primarily economic, and yet, having spent the earlier years of my professional life in the service of the United States Government at Washington, and the late years in that vortex of so-called political reform, the city of Cleveland, I hope you will pardon my inability to resist the temptation to preface my lecture with some observations regarding this question of public vs. private ownership of large businesses, for in my judgment the lighting business is peculiarly illustrative of the methods of development and of the possible accomplishments of large industrial organizations under private ownership.

## Development by Individuals

It is interesting to review briefly the history of what might be termed the industrial method, from its earliest beginnings to the complex and highly developed state in which it exists at the present time. To revert to the time when each man performed for himself all simple processes of manufacture, if they may be so termed, and then to trace the development through those early stages when the appreciation of the value of differentiation of function and specialization of effort ushered in a new era, would be to repeat an old and well known story. But to trace the progress from that point on brings out many interesting facts with which perhaps most of us are acquainted, but to the analysis of the development of which few of us have given much thought. It is of course apart from my purpose to enter into detail in tracing such a development, but there are several important characteristics, as I see them, to which I would like to refer for a moment.

For a long time in the industrial development the initiation of new methods and the invention of new processes and products were left largely to the individual. It was not many years ago when the idea of directed initiative on the part of large manufacturing concerns was conceived and put into practice. One of the striking illustrations of the possible accomplishment of such a plan is to be found in the development of the microscope and other useful optical instruments, as the result of employment by Carl Zeiss of the young physicist Abbe, who at the recommendation of Helmholtz devoted his efforts to the investigation of problems of practical importance, not improbably suggested by the unusual commercial instinct of the manufacturer, Carl Zeiss. Now all large industrial corporations, particularly those engaged in the manufacture of some commodity requiring a high degree of technical skill, have large laboratories with a staff of scientifically trained men for the purpose of development.

## Accomplishments of Laboratories

The reason for the comparatively slow development of this scheme, which has beyond any question justified itself by its results, is probably twofold. In the first place the idea was probably slow in gripping manufacturers as a justifiable and profitable enterprise, and secondly the practical application of the idea was only possible when business reached the stage of development when the comparatively large investment and expense necessary for such an adventure could be afforded. In my judgment this one feature alone—the maintenance of development laboratories—in its ultimate economy in production and in the consequent reduction in price to the consumer, justifies the principle of large businesses as against the dissolution of large business into small competing units. The very recent history of the Mazda lamp is a striking illustration of the possible economy resulting from the development work carried out in the laboratories of industrial corporations. In the six or seven years since the tungsten filament lamp was first developed, not only has the quality of the lamp been tremendously improved, but the process of manufacture has been so greatly simplified and cheapened, that the price of the lamp has in this short period been reduced from the initial cost of $1.50 to the present cost of 30c. I am anticipating this new price by two days. Under private ownership the stimulation for this development has been great and only through the growth of large consolidated businesses has this been practicable.

## Science the Basis of Industry

The second characteristic to which I would refer is the entire dependence, up to the present time, of the industries, in their industrial developments, upon the pure science developed entirely either by educational institutions or by individuals in no way affiliated with these industries. The industries must depend continually on the pure science developed without direction, and without other goal than the establishment of truth.

The interdependence of scientific conception and industrial application is so patent, even to the most casual observer, that it would be presumptuous to undertake to demonstrate the intimate relationship existing between these two branches of human knowledge and human achievement. And yet, I fear, even the most thoughtful are apt at times to acquire a somewhat distorted perspective. We have but to turn the pages of history to convince ourselves of the truth of the proposition—"Every industrial achievement is traceable to some antecedent discovery of natural science." And I am inclined to think that the more careful student of the history of natural science and the industrial arts will at the same time be convinced of the truth of the converse of this proposition, viz., "Every discovery of natural science conduces to some subsequent industrial application." The direct proposition gives the keynote to the developments of the past; the converse proposition gives the keynote to the possibilities of the future.

The cycle of the conception and application of scientific truth is of variable duration. In one epoch an hypothesis is conceived, or a new phenomenon discovered; in another it receives experimental confirmation and is correlated with the rest of classified knowledge; in another it is applied to meet some human need, or to satisfy some human desire; and then we all forget its origin in the close familiarity of everyday life with it. This entire cycle may take place within the brief period of a single human life, or it may extend over centuries. The important fact to be remembered is that every achievement of scientific investigation will complete its cycle at some time.

## Examples of Applied Science

Illustrations crowd upon us in every domain of applied science. Indeed, the very term "applied science" records indelibly the scientific origin of those applications which have made their advent so recently that their parentage has not yet been forgotten. Messages transmitted through the medium of electric waves we call "Marconigrams," but do we forget that without the theory of the physicists Faraday and Maxwell, and the brilliant experiments of the physicist Heinrich Hertz there would be no wireless telegraphy to-day? As a still more familiar illustration it is only necessary to consider the navigation of the seas, which wireless telegraphy is now robbing of many of its perils, to be reminded of the scientific origin of the most commonplace achievements of our civilization. The mariner's compass and the science of the heavens are the prerequisite conditions of every trans-oceanic passage, but few of us picture the unappreciated scientists pursuing in his isolation the investigations which have brought happiness and wealth to thousands of his posterity.

In these homely illustrations one man has conceived, another has applied, and humanity has reaped the benefit. It sometimes happens that scientific ability and practical genius are united in a single individual. One of these rare examples is to be found in the late, deeply lamented, Lord Kelvin, whose pioneer work on the trans-Atlantic cable stands out uniquely as the accomplishment of the happy combination of pure science and engineering application.

In our present highly complex and completely differentiated civilization the combination of scientific imagination and engineering accomplishment in a single individual is rare, and quite likely, I think, to become obsolete. On the other hand, the relation between the physicist and the engineer is daily growing closer. The discoveries of science are more eagerly grasped at, and more quickly applied. The differentiation of functions is accompanied by an integration of results. This is the only proper organization, and to those far-sighted men who appreciate the interdependence of theory and practice, in whatever branch of human activity they may be engaged, will ultimately come the fullest measure of genuine success.

## An Industrial Corporation Furthering Scientific Development

I am very glad to be able to-night to present to you briefly what to the best of my knowledge, is the very first instance of an industrial corporation recognizing its duty in assisting in the development of those sciences on which its business fundamentally rests and realizing the possibilities of progress and ultimate success in the establishment of a laboratory for the development of pure, as contrasted with what is ordinarily termed applied, science. More than five years ago the National Electric Lamp Association, which has now become the National Lamp Works of General Electric Company, organized a laboratory for the study of the science of light, with which laboratory I have had the privilege of being connected since its inception. The history of this laboratory is very closely associated with the history of the recent great advance in the development of the new science of illumination.

It is a somewhat surprising fact that the development of a real science of illumination dates only a few years back. When one stops to consider the investment, the effort and the ingenuity which have been expended in developing methods of generation and distribution of electrical power, in developing methods of manufacture and distribution of illuminating gas, in the invention and development of the Welsbach mantle, the carbon, tantalum and tungsten electric incandescent lamps, the numerous types of ordinary arc lamps and low pressure arc lamps, and in the development of fixtures, shades and reflectors, I think it is somewhat surprising that with so great an expenditure in the development of what might be termed the tools of illumination, so little thought was given to the development of the uses to which these tools should be put in accomplishing the object in view, viz., satisfactory illumination. Under private ownership the development of all of these tools has taken place at a remarkable rate, and the outcome has been the perfection of a system which makes artificial light available for all at a very moderate cost. It remains, however, for the new science of illumination to study the methods of using these tools of illumination to the best advantage.

## "Illuminating Engineering"

About eight years ago the Illuminating Engineering Society was organized. Two or three years later the example set in America was followed in England. Several years later a similar society was organized in Germany and only last September an International Commission on Illumination, representative of the ten principal countries of the world, was organized. For a long time the question was asked, "What is illuminating engineering" and for a long time the answer to this question was largely a function of the individual giving it. In 1910 a course of lectures was given at the Johns Hopkins University on the initiative of the Illuminating Engineering Society and under the joint auspices of the society and the University. This lecture course, which in my judgment was one of the most remarkable ever held, answered once and for all the question, "What is illuminating engineering"? The Baltimore Lecture Course, as this has come to be called, consisted of thirty-six lectures, extending over a period of two weeks, three lectures being given each day and no lecturer giving more than three lectures. The total number of lecturers amounted to twenty-four men and nearly every one of these men was a leader in the subject on which he lectured. As I stated before, these lectures constituted and still constitute an answer to the question "What is illuminating engineering"?

It may not be uninteresting to read a list of the lectures that were given on that subject, for I have no doubt that to many of you, this modern development in illuminating engineering is comparatively unknown. If I am not incorrectly informed, the very first efforts that were put forth in the generation of electric power were for lighting. The National Electric Light Association was organized under that name because the central stations at that time were concerned largely with the generation of power for lighting, and only in later years has the application of electric power for power purposes been developed. It is somewhat surprising that with all the effort and money expended in the development of the tools of illumination, very little should have been done in developing the science of illumination itself, and so it may not be uninteresting to simply read to you the titles of those thirty-six lectures, and of the twenty-four men giving them, in order that you may have for yourselves an idea of the correct answer at the present day to the question, "What is illuminating engineering"?

## Lectures at Johns Hopkins

The first group of these lectures was given on The Physical Basis of the Production of Light, by Professor Ames of the John Hopkins University.

The second, two lectures, was on The Physical Characteristics of Luminous Sources, by myself.

The third was on The Chemistry of Luminous Sources, by Dr. Whitney, Director of the Research Laboratory of the General Electric Company.

The fourth, two lectures, was on Electric Illuminants, by Dr. Steinmetz, with whom all of you are familiar.

The fifth, two lectures, was on Gas and Oil Illuminants by Mr. Whitaker, Professor of Industrial Chemistry at Columbia University, and Superintendent for the Welsbach Company, and Dr. Humphreys, President of Stevens Institute of Technology.

Two lectures on the Generation and Distribution of Electricity with Special Reference to Lighting, were given by Professor Whitehead of the Johns Hopkins University.

Two lectures on The Manufacture and Distribution of Gas, with Special Reference to Lighting, were delivered by Mr. Addicks, of this city, and Mr. Cowdrey, of the Peoples Gas Light & Coke Company of Chicago.

One lecture on Photometric Units and Standards, was given by Professor Rosa of the Bureau of Standards, Washington.

Two lectures on the Measurement of Light, were given by Dr. Sharp of the Electrical Testing Laboratory of this city.

Those are the subjects with which we ordinarily associate lighting.

Now we come to those that are a little away from what might have been called the orthodox subjects.

One lecture on the Architectural Aspects of Illuminating Engineering, by Mr. Walter Cook, Vice-President of the American Institute of Architects.

One lecture on the Decorative Aspects of Illuminating Engineering, by Mr. Louis Tiffany.

Two lectures on The Physiological Aspects of Illuminating Engineering, by Dr. P. W. Cobb of the laboratory with which I am connected.

One lecture on the Physiological Aspects of Illuminating Engineering, by Professor Yerkes of Harvard University.

Six lectures on the Principles and Design of Interior Illumination, by Mr. L. B. Marks of this city and Mr. Norman Macbeth, then of the Welsbach Company.

Three lectures on the Principles and Design of Exterior Illumination, by Dr. Bell, Consulting Engineer of Boston, and Mr. E. N. Wrightington, Vice-President of the Boston Consolidated Gas Company.

One lecture on Shades, Reflectors and Diffusing Media, by Mr. Van Rensselaer Lansingh.

One lecture on Lighting Fixtures, by Mr. Edward F. Caldwell, Senior Member of the well known firm of E. F. Calkwell & Co., of this city.

One lecture on The Commerical Aspects of Electric Lighting, by Mr. John W. Lieb, Jr., of this city.

One lecture on The Commercial Aspects of Gas Lighting, by Mr. Walton Clark, Vice-President of the United Gas Improvement Company, of Philadelphia, and President of the Franklin Institute, Philadelphia.

I think the simple reading of that list of lectures will give a better idea than I could give in any other way of the scope of illuminating engineering at the present time.

This course of lectures was supplemented by a laboratory course open to anyone who attended, and it may be interesting to know that 240 men from many parts of the United States, as far west as California, all of them graduate students—I should say really post graduate students—they were men who were out in business—gathered in Baltimore for those two weeks of lectures, and 80 of the 240 attended every lecture.

I think it is of interest in connection with what the presiding officer, Mr. Franklin, said to-night that these men availed themselves of the opportunity presented for getting the latest information in subjects in which they were interested.

## Aims of Illuminating Engineering

The outline of this course which I have just read shows immediately that the duty of the modern illuminating engineer is not merely to compute the foot-candles of illumination on a given test plane and let it go at that. The goal of illuminating engineering is not the mere computation of foot-candle illumination necessary for vision, the design and application of lamps and reflectors which will give a uniform or non-uniform distribution of illumination, as the exigencies of the case or the whims of the designer may dictate; it is not the cold, calculated plan of illumination which keeps within the bounds of economy, and does not trespass upon those fields implanted by physiological research with the warning sign of "Dangerous." The goal of illuminating engineering will have been attained when as a result of the concomitant development of its component elements, it will be possible in every case presented, to design a lighting installation which will be efficient, effective, artistic; which will produce an illumination correct in quantity and quality, properly balanced as to high-light and shadow, restful to the eye and harmonious with the form and color scheme involved; which will stand the rigorous test of logical analysis and will appeal to the most highly developed sense of beauty.

The Nela Research Laboratory of the National Lamp Works of General Electric Company is concerned with the development of those correlated sciences on which the science of illumination rests. The staff of the laboratory comprises seven physicists, a physiologist and a psychologist, all engaged in the study of those problems in pure science which have to do with light. I wish it were possible tonight to describe to you in detail the work of the laboratory, which is intimately connected with the present progress that is being made in lighting.

I would like, for example, to show you experiments illustrative of the work in the study of the light-giving properties of matter. Why does the Welsbach mantle give a much higher efficiency than the open flame? Why does the Mazda lamp give a much more efficient light than the old carbon lamp? What other methods can we conceive of as possible means of getting more efficient radiation than we get at the present time?

## A Great Field for Progress

I almost hesitate to tell you what the actual efficiency—or I had better say inefficiency—of lighting is even at the present time. If we should assume an ideal lamp such that all the energy that we put into it comes out in light, and in that form which would be most efficient, then on that basis, the efficiency of the most efficient Mazda lamp at the present day would only measure five or ten per cent. The other ninety per cent. of the energy is lost so far as light is concerned. That sounds like a very startling admission. The maximum efficiency of the most efficient artificial illuminants that we have, such as the high efficiency luminous arc lamps, or perhaps the quartz mercury arc, when operated under ideal conditions, leaving aside consideration of their other characteristics, whether or not they are available in particular kinds of lighting, is still but a relatively small part of the highest conceivable efficiency. The rest of the energy is lost, and I have to confess that the prospect is not what one would call cheerful of getting much more out of it. We are getting more all the time, and yet we know that the little firefly is far more efficient than any illuminant that we have. If we rate the firefly on the same physical basis that we rate the Welsbach mantle or the Mazda lamp, the firefly has an efficiency over 95 per cent., whereas the artificial light, the best we have, has an efficiency in the neighborhood of one-tenth or even one-twentieth of that figure.

Of course, there are opportunities for development of illuminants, but we must develop first the science of light. We must study the radiating properties of matter, because knowledge of the things as they are is the very best possible suggestion of things as they may become.

## Utility of Light in Therapeutics

I would like to discuss with you some of the important problems in connection with the effect of light on the eye and on the skin—another line of work which we are carrying on in our laboratory. We hear much of what the Germans call "Lichttherapie," the use of light in medicine. I am sorry I cannot say much to you that is very definite regarding that, for this one reason, that very little is known. There is much speculation. We know some of the extreme effects. It has long been known that you can prevent pock marks by excluding the blue light or the light of short wave-length, and by having only red light or no light at all. We have known for a long while that ultra-violet light, as we call it, or the light that is most effective in producing chemical changes, is very effective in killing certain kinds of organisms, and it was thought for a while, and perhaps is still thought by some, to be effective in cancer treatment, but the extremely short waves produced by radium have now taken the foreground in this field. We know that ultra-violet or chemically active light is very destructive of eyesight. We know of many cases in which the eye on exposure to this light, that is, to light near or beyond the blue end of the spectrum has become greatly inflamed. A number of discreet phenomena have been observed and yet the present state of knowledge on this very important question of the physiological effects of radiation, particularly of the effect of light on the eye is extremely limited.

## Psychology of Lighting

I would like to tell you something about the work that is being done in what we call the psychological department of the laboratory. It seems to be a long call from the manufacture of incandescent lamps to the psychology of lighting, but there is not one of you who does not frequently sub-consciously do a little psychological work himself in regard to lighting. On a cold, rainy, cheerless night, very few of you would visit that friend who has a cold, greenish light up near a white ceiling in a bare room. You would hunt out the man who had a low, soft light down on the table or an open fire. Why? The other light does not affect your vision. The other light does not make it any more difficult for you to read. It may be easier. There is an element here that we call, for want of a better term, psychological. We have not started to investigate that question which is difficult of investigation. There are moreover many things that must be studied beforehand, and much valuable information can be secured from the study of vision in animals—a line of research which is being pursued in the laboratory at the present time.

There is one phase of the work that has been developed by Mr. Luckiesh of our laboratory, which is so easy of demonstration and which appeals so immediately to every one, whether he be scientifically trained or not, that I have determined to conclude this lecture with this demonstration, which I believe will be of interest to you all. It shows the possibilities in the development of the art of illumination and I might add of the illumination of art.

(Experimental demonstration with extemporaneous explanation.)

## Progress During 35 Years

In October, 1879, the first successful carbonized paper filament lamp was manufactured. It had a life of 40 hours. The cost of manufacture was from $1.50 to $1.75 apiece. In 1883 the Edison 16 c.p. lamp was sold in England at approximately $1.00 apiece. Now, 35 years later, the 25 watt Mazda lamp with a life of 1,000 hours retails at 30c. apiece and this Mazda lamp has an efficiency at least four or five times that of the early carbon lamps that sold at a much higher price; and still more efficient lamps are on the way. In 1879 any lamp that would burn was acceptable and no further thought was given to the lamp than that it should burn and give light. Today we have learned to use lamps in the way to produce the effects some of which I have described and shown you to-night. Such has been the progress of lighting since the invention of the incandescent lamp some 35 years ago.

# Telephones at Home and Abroad.

### By T. P. Sylvan

It is indeed a privilege to be allowed to come to the Young Men's Christian Association Finance Forum, for I have had the good fortune to hear a great many things said about the wonderful course which you have conducted here during the past year. I am only sorry that the notice given me was not sufficient to permit of preparing something really worth while, and I shall have to ask you to bear with me in what I may say if it should fall short of your expectations.

It is indeed true, as Mr. Leach said, that it is but a few years ago since the telephone was invented. It is not long since 1876, and the inventor of the telephone, Mr. Bell, is to-day hale and hearty, living in Washington, and be it said to his credit, still doing a great deal of good for mankind. His house is a mecca for young inventors, scientists, and other struggling seekers after right and truth, and, as you know, he is particularly interested in alleviating the condition of the deaf and dumb.

## Early Problems

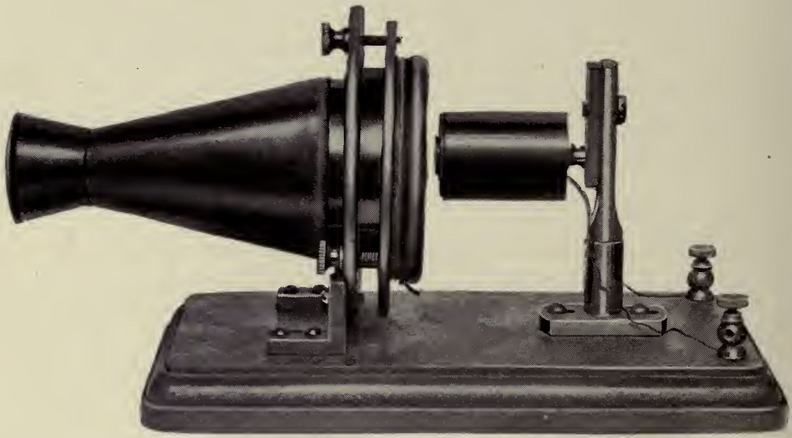
The early growth of the telephone was very slow. When the telephone business started, it was a serious question as to how it should be developed, whether by sale of the apparatus, or by the so-called licensing—of territory with the right to use instruments. As we now see it, it was fortunate that the manner of development took the form of license, for the parent company by that process maintained a direct interest in the product of the factories; in other words, they kept in constant touch with the changes and improvements in the art, and were in a position to urge the adoption of these changed articles, which would not have been the case if they had merely entered the market and sold them to various companies.

As you perhaps all know, the early system of the telephone consisted of aerial open wires, the so-called grounded system, consisting of one wire for each line, the instrument and the other side of the circuit, so-called, being the earth, which, strange as it may seem, is the best conductor we have. It was not long, however, until the introduction of the other forms of electric energy as the lighting and street car systems made the old grounded system impossible, and the companies were forced to adopt the so-called metallic circuit system, composed of two wires in place of one. This was a great problem in that early day, because open wires took a great deal of room, and I hope to show you a little later a few pictures which will bring back to your memory scenes of prosperity at that time, as far as the industry was concerned, but rather unsightly from the standpoint of the citizen.

Then we had the difficulty of taking care of the noises, and I don't know whether you may remember back in the early days of the telephone, there was a good deal of trouble in hearing conversations. All sorts of humming and whizzing on the wires, and that had to be overcome by the so-called scheme of transpositions and other improvements in method and apparatus. If you have ever gone over the highways, you have doubtless seen at different points places where the wires cross and take a different position on the pole. That has been figured out scientifically so that now practically all noise is eliminated by such crossing of wires, technically known as transpositions.

Next in our development came the wonderful cable system. We now think nothing at all of seeing these large cables pulled into the streets, or hung overhead, suspended on poles, but it took considerable ingenuity to devise and perfect the cable, and get one which would really work.

Then came our underground system, and then we had in the early days the so-called magneto system, where you turned the crank when you called central, and when you were through, you were supposed to turn the crank again and notify central that you had finished with your conversation, and, unfortunately, if you did not, your line would be considered busy until somehow, by accident or otherwise, it was discovered that you were through talking.



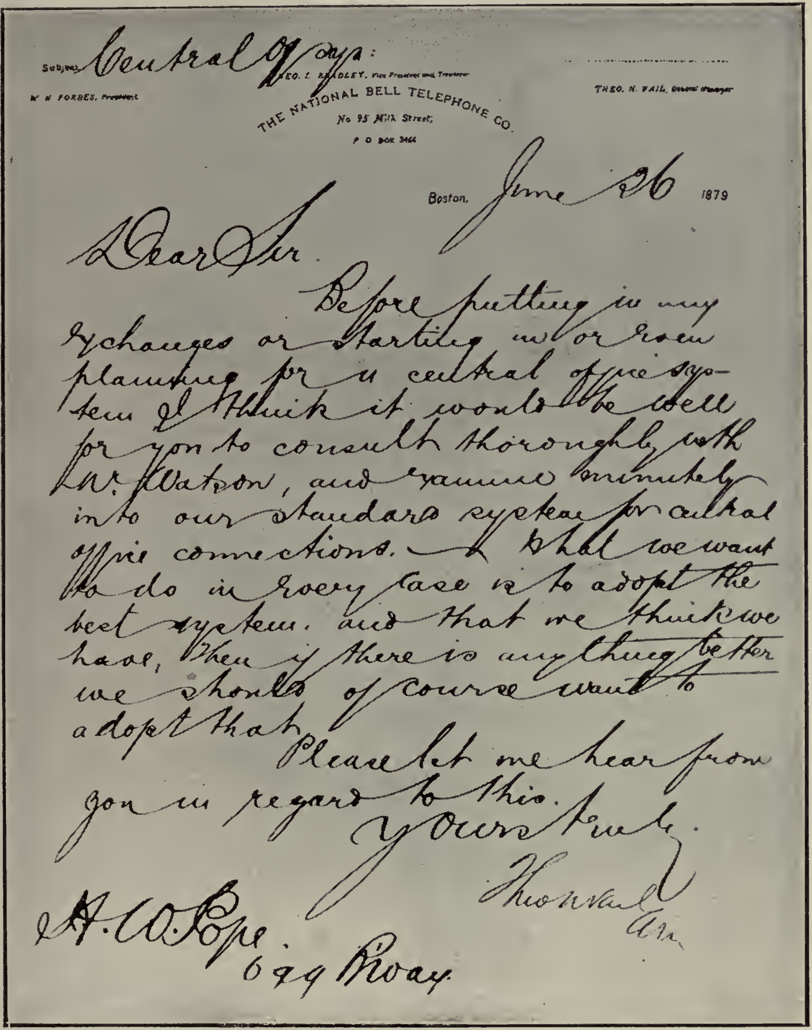
PROF. ALEXANDER GRAHAM BELL'S ORIGINAL TELEPHONE TRANSMITTER EXHIBITED AT THE CENTENNIAL EXPOSITION, PHILADELPHIA, 1876.

It was not long before we got through with that and adopted the familiar common battery system now in use, where all the signalling is taken care of from the centrally charged batteries, and where, the moment that you raise the receiver from the hook, you light a little lamp in the switchboard, and when you are through, you extinguish the light and apprise the operator of such fact.

Then came the multiple switchboards. In the early days we had a somewhat crude switchboard. It was necessary to have a great deal of assistance to complete a call. It took a long time, and a great deal of effort, and we finally devised the multiple switchboard, so that everyone in an office of 10,000 lines could be reached by each individual operator without the aid of another operator.

## Influence of Message Rates and Toll Lines

But to me, the most wonderful development so far as our system in New York is concerned, was the adoption of a proper rate scheme. In the olden time, we had what is still in vogue in some places, the so-called flat rate charge. By that process the telephone was restricted to a very small clientele, the large users. They were used considerably in excess of their normal capacity, and the service was very poor. We finally



Subject Central Office:
W. H. FORBES, President
GEO. L. BRADLEY, Vice President and Treasurer
THEO. N. VAIL, General Manager
THE NATIONAL BELL TELEPHONE CO.
No 95 Milk Street,
P O BOX 3466

Boston, June 26 1879

Dear Sir.

Before putting in any Exchanges or Starting in or even planning for a central office system I think it would be well for you to consult thoroughly with Mr. Watson, and examine minutely into our standard system for central office connections. — What we want to do in every case is to adopt the best system. and that we think we have, then if there is anything better we should of course want to adopt that.

Please let me hear from you in regard to this.

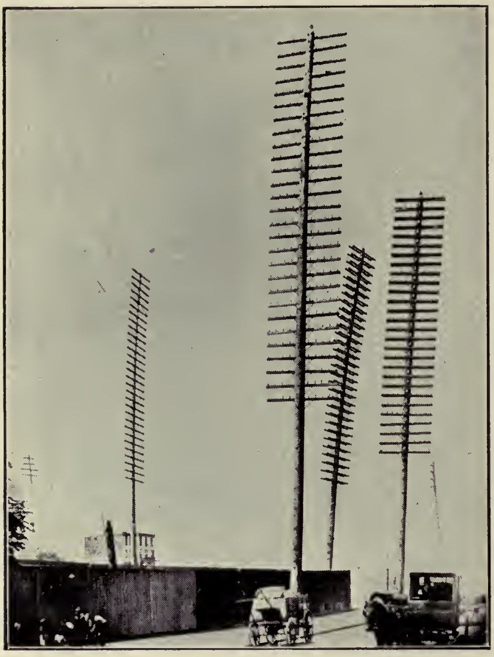
Yours truly.

Theo N Vail
G M

H. A. Pope.
679 Bway.

REPRODUCTION OF LETTER WRITTEN IN 1879 BY THEODORE N. VAIL EMBODYING A POLICY WHICH HAS BEEN CONTINUOUSLY FOLLOWED BY THE BELL SYSTEM.

discovered a means of more equitably distributing the charge and facilitating the service, and the message rate came into use, and immediately with the adoption of the message rate, our steady growth became assured. In the year 1900 we had in our system 600,000 telephones, and in 1914 we have the tidy number of 8,400,000 telephones in use.



NEW YORK'S TALLEST TELEPHONE POLE LINE, 90 FEET ABOVE SIDEWALK ON WEST STREET AND CARRYING 30 CROSS ARMS WITH 300 WIRES.

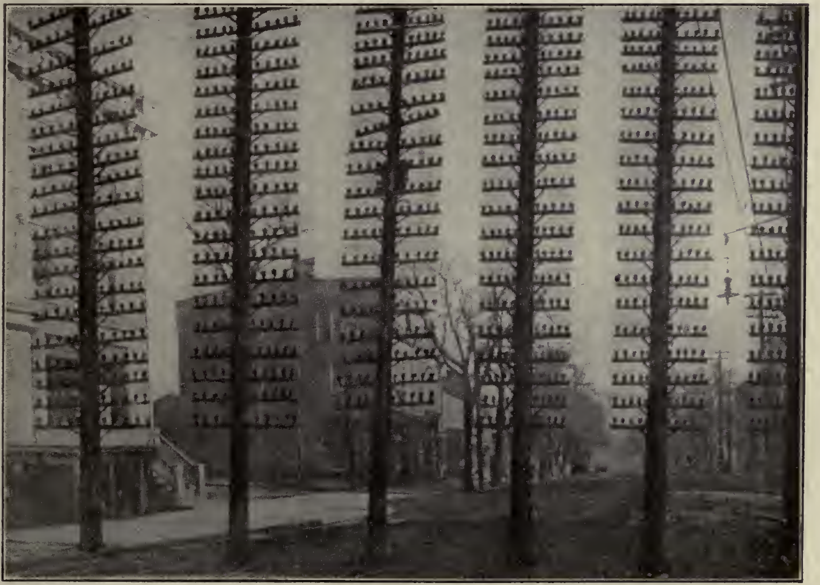
In the early days no thought was had of long distance service. While Mr. Bell, in a very prophetic letter—it is almost impossible to conceive how a man could have looked so far into the future—but in the early days he wrote a letter foretelling what we now have in its entirety, both the private exchange development and the toll line development, and everything else, but he was looked upon as a dreamer. When the toll line system became possible, there came the inauguration and development by the Bell Company of their toll line service, and the formation of the American Telephone & Telegraph Company. Prior to that time, the so-called Bell System consisted of a lot of licensees, in other words, a band of people in some Western city got together and came East, and entered into a contract with the owners of the patents, obtaining a license for a certain territory, and their whole and sole aim was the development of the territory in their immediate vicinity.

As the toll line system became possible, the American Telephone & Telegraph Company was organized, and it started by building toll lines, and in the year 1893, the year of the World's Exposition, it completed a line from New York to Chicago. Immediately upon making the toll line service, the present plan of universal service became the slogan of the Bell System.

## Twenty-seven Million Conversations Daily

And remember very well that the so-called cry for universal service has not been a cry for universal ownership. Unfortunately a great many people have believed that the object and purpose of the Bell Company were to own every telephone in the country. It has never been the program or the desire to have that a fact. However, there has been a desire which we feel every right-thinking citizen will uphold of having a universal system so that every telephone in the country would become the center of the system, and there would be complete interconnection. As a result of that policy carried on vigorously all these years, on the First of January, 1914, the Bell System has connected with its own telephones, 2,717,808 telephones, all of which are owned by companies independent of and not controlled by the Bell System, all forming a part of this grand universal service. The telephone company at this particular time reaches 70,000 places in this country. 70,000 places mean nothing except by comparison, and in making the comparison, I wish to call your attention to the fact that now we have 60,000 Post Offices and approximately 60,000 railroad stations. More than 27,000,000 messages are handled daily over the Bell System's lines. Just conceive of what that is. 27,000,000 conversations handled daily over the Bell System.

Now, that means efficiency, surely. That means the saving of many steps, and I have often said that we have a paradox in that our wonderful system makes this city possible, and it not only makes it possible, but it makes some parts of it unnecessary, for example, you could never conceive of the Woolworth Building or the Singer Building without telephone service. It would be impossible to do business in that building, and yet this marvelous instrument of ours which annihiliates space makes necessary such congestion? So we have a paradox in the telephone. It makes congestion possible and yet unnecessary.



APPEARANCE OF A CITY STREET IF TELEPHONE WIRES HAD NOT BEEN BURIED UNDERGROUND.

## Long Distance Service Compels Organization

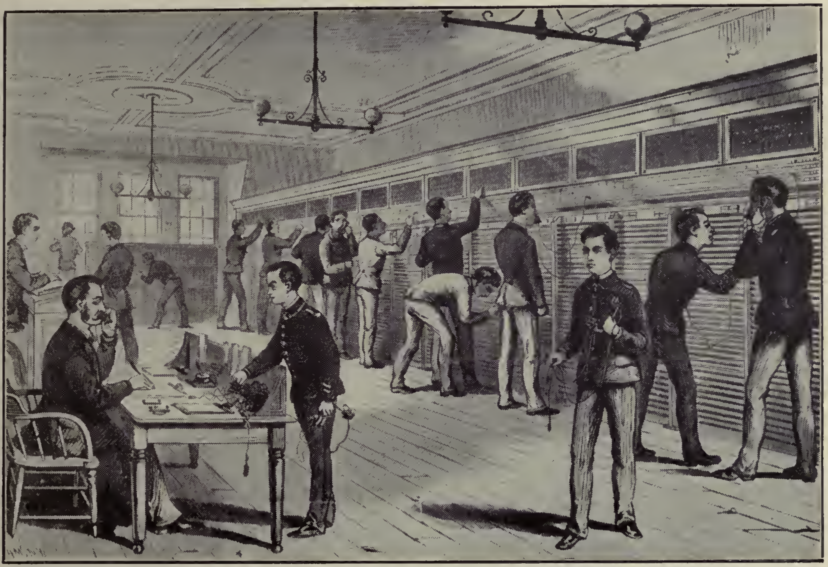
To show its wonderful development and the difficulties that had to be overcome—I remember very well when the long distance lines were built to Cincinnati, Ohio. I was then living in the West. The Cincinnati company have always been a progressive company, and almost always in advance of the other companies, and yet at the moment when the American Telephone & Telegraph Company lines were completed, it was impossible to connect those wires with the local exchange system in Cincinnati and give a commercial service, and for almost two years it was necessary to operate those long distance lines in booths in an office in that city, and people had to do in Cincinnati what people now do in many European cities, they had to leave their places of business and go to this central office and do their talking. It became then very evident that the company had to co-ordinate all the work of the various companies and so plan every part of the apparatus, not only the toll lines, but the local apparatus as well, that when they were connected together, they would render efficient service. In fact, that demonstration of the long line work is what led to the magnificent organization to-day maintained in New York for the engineering and handling the many problems of the work, an organization that is the pride of our own system and of the pride of the world, because much as our friends may say about conditions on the other side of the water, it is a strange commentary on our own condition here that there is not a week that goes by that we do not have large delegations of engineers visiting our plants and studying our conditions, not studying theories, mind you, but the actual results which we in America have accomplished.

A few years ago we had completed the next step in our long distance progress, that is, the line from New York to Denver, and to-day we furnish commercial service from New York to Denver, the longest, by far, of any in the world.

### "That Must Not Happen Again"

In 1909, you all remember the blizzard we had. That was at the time of the inauguration of President Taft. Washington was isolated from the rest of the country. There was not a train running in or out of the Capitol City, not a message of any kind was coming out of or going into that city. Strange as it may seem, we are accused by some of having nothing but a mercenary spirit and no ideals, but if you had seen our old grayhaired President, Mr. Vail, bring his fist down and say, "That must not be allowed to happen again"—and then and there, under his instructions, was started our magnificent plan to prevent such conditions. We had not much to go by because it had not been tried anywhere in the world, and it had only been made possible by the acquisition of the so-called Pupin patents, the inventions of Professor Pupin of Columbia University—it was only possible by reason of those patents to even dream of what we afterwards accomplished, and with nothing further to assure us than the faith in our own engineers, we launched the project which finally cost Five Million Dollars, and which had for its object the linking of New York, Washington and Boston by underground cables, so that no matter what sleet storms might come, they could never isolate such cities. What a fortunate thing for us it was that this had been undertaken, and that the blizzard of this year was so kind to us in that it deferred coming until we were ready for it, because the week after we had cut in this underground cable, along came the blizzard, and the only outlet New York had was this new channel.

The next step in our plan—not content to stop and wait—but the next goal that we look forward to, and I can assure you that Mr. Vail has a very lively interest in it, is the linking of New York with San Francisco, and unless we are all immensely disappointed, when the exposition opens its gates in San Francisco next year, we will have a practical working line from New York to San Francisco.



THE FIRST CORTLANDT EXCHANGE. BOYS WERE EMPLOYED AS OPERATORS AT FIRST, BUT THEY WERE NOT ADAPTED TO THE WORK AS WELL AS GIRLS WHO SUPPLANTED THEM.

## Welfare Work for 200,000 Employees

So you see, we too have our ideals. There is the pleasure of accomplishing things which is present in every industry and in every human being. Aside from all this, with the work going on in our business as it does, we have time to think of other things, and the First of January, 1913, the Bell System inaugurated what to us is a magnificent pension, sickness and accident disability scheme. Under that scheme our employees are pensioned when old, they are paid their wages in case of accident or sickness, and in case of death, if they have been in the service five years or more, they have the equivalent of life insurance,—and this without any direct charge against the employees. In welfare work, we have also had time to look after the affairs of our employees, and we are very proud of the fact that recently we were awarded a medal by one of the societies for having been foremost during the last year in this kind of work. We have in our system approximately 200,000 employees, and I want to say to you that our wonderful success has in a large measure been due to the gradual rise of men from the ranks into positions of trust and importance.

## President Vail and His Slogan

Take Mr. Vail as a good example. Mr. Vail was in the postal service years ago organizing the railway mail service, when he was wise enough, as pretty much all the men are who have opportunity, to leave that service with its limits and enter the field of the telephone. He was the first General Manager of the American Telephone & Telegraph Company, or, rather, the old American Bell, as it was then called, and he is to-day the head of our system. No politics counted in his appointment, no politics count in the appointment of any of our people. It is a pleasure to have the men working for us free from any influence of that kind, and able to take their part in the world's work.

I would like to say here that in 1910 Mr. Vail published a so-called slogan, and I want to read it to you.

"It is believed that the telephone system should be universal, interdependent and intercommunicating, affording opportunity for any subscriber of any exchange to communicate with any other subscriber of any other exchange within the limits of speaking distance, giving to every subscriber every possible additional facility for annihilating time or distance by use of electrical transmission of intelligence or personal communication. It is believed that some sort of a connection with the telephone system should be within reach of all. It is believed, further, that this idea of universality can be broadened and applied to a universal wire system for the electrical transmission of intelligence (written or personal communication (from every one in every place to every one in every other place, a system as universal and as extensive as the highway system of the country which extends from every man's door to every other man's door."

## Sixty-five Per Cent. of the World's Telephones

Now, that is our goal and that is our aim, and I do not believe any one can have any better objective than that. How well we have succeeded in that, I wish to state in just approximate figures. This country now has more than 65 per cent. of the total telephone development in the world, though our population is less than six per cent.; more than 65 per cent. of the development, with less than six per cent. of the population. Despite all statements to the contrary, we are not through growing. We do not feel at all satisfied because this year, 1914, if it all goes well, our budget has been made up on the basis of expending the tidy sum of $60,000,000 in additions to our plant.

Now, every year budgets are made up. Every year studies are made. It is not a matter of accident. It is not a matter of guess work, but in every system of the United States, in every city of the United States, in every territory of the United States where the Bell Company has lines, estimates are made, and what is more, those estimates are made carefully enough to be of some avail in fixing expenditures.

Some of the opponents of the privately owned systems of the United States have attempted to explain away this magnificent growth of ours by the statement that the growth came because of the prosperity of the country. We do not think that this is fair. We think that the prosperity is due to the methods by which this country has been governed in the past, by the efforts of the telephone company, by the efforts of the electric light and the other utilities, the railroads, and the business interests, and not least of them, by the efforts of the Y. M. C. A., because all you have to do is to come right down to the end of Broadway some beautiful day, see these foreigners coming over to our shores with their bags and baggage and their quaint costumes, and think of those people having left their own firesides to come to our country, and at the moment they enter Ellis Island here, a new horizon has appeared. See those people a few years afterward, after some of them have attended the night schools of the Y. M. C. A. and have become acquainted with our methods, and with this grand country of ours, where opportunity is present, where they are released from the dominating influence that goes with the old countries, and their ways, and see what has happened, and see what progress has been made.

CORTLANDT EXCHANGE TO-DAY.

I do not think the country is all to the bad. I do not think we have got to do so much to change things, and I think a great deal of credit should be given by us to-day to the wisdom of our forefathers, for they planned well, and I say to you that I believe that we in this country should say that the prosperity we now enjoy is the result of the methods employed, rather than to explain our progress as due to prosperity, for, mind you, our population is nothing but the conglomerate mass from the other side.

A TYPICAL TELEPHONE CENTRAL OFFICE, SHOWING CHIEF OPERATOR, ASSISTANT CHIEF OPERATOR, SUPERVISORS, AND OPERATORS AT WORK.

Another way to refute such a statement as that is to look at Europe itself. We find that in Denmark, where most of the telephone service is privately owned, there is more than two and a half times as many telephones per one hundred inhabitants as in Great Britain, six times as many as there are in France, more than twice as many as there are in Germany, and more than five times as many as there are in Belgium, twice as many as in Switzerland, and three times as many as in the Netherlands. In other words, private ownership and initiative have worked there as they have in this country. Sweden and Norway, which also have private as well as governmental operation of the telephones, and where the private telephones predominate, rank next to Denmark, and in the city of Stockholm, in which both private and government systems prevail, with the private telephones in the lead, there are more telephones per hundred of population than in any other city in the world, exclusive of San Francisco, which ranks first. Again, private ownership there has worked well; private initiative there has accomplished results.

## Regulation of Utilities Prevents Costly Duplication

There has been a gradual change in public sentiment in this country, a wonderful improvement, due largely to the acceptance of regulation as preferable to duplication of utilities. Regulation to me has marked a wonderful step in our industry and in our country. In the early days there was competition in practically all lines of public utility. Duplicate gas plants, duplicate electric light plants, and in many towns duplicate telephone plants. Now, this country had sense enough to say—"We do not want monopoly, we do not want a fixed and inflexible monopoly in anything, but we want a regulation of this industry"—and in practically every state in the union to-day we have regulatory bodies, and the laws under which these bodies act provide for the fixing of the rates and service, fixing the rates not upon the mistakes of the past, not upon any watered capitalization, but upon the actual value of property used and useful in the public service, and, furthermore, practically every state in the union has seen fit to adopt a policy that prohibits the entry of a new utility into a field already occupied, unless this public commission first decides that a public necessity requires such new utility. Now, mark you, this is a wonderful advantage, because in the first place the public utility commission has the power to regulate rates and service. If, for any reason, the corporation in the field forfeits its right to the respect of the citizens,

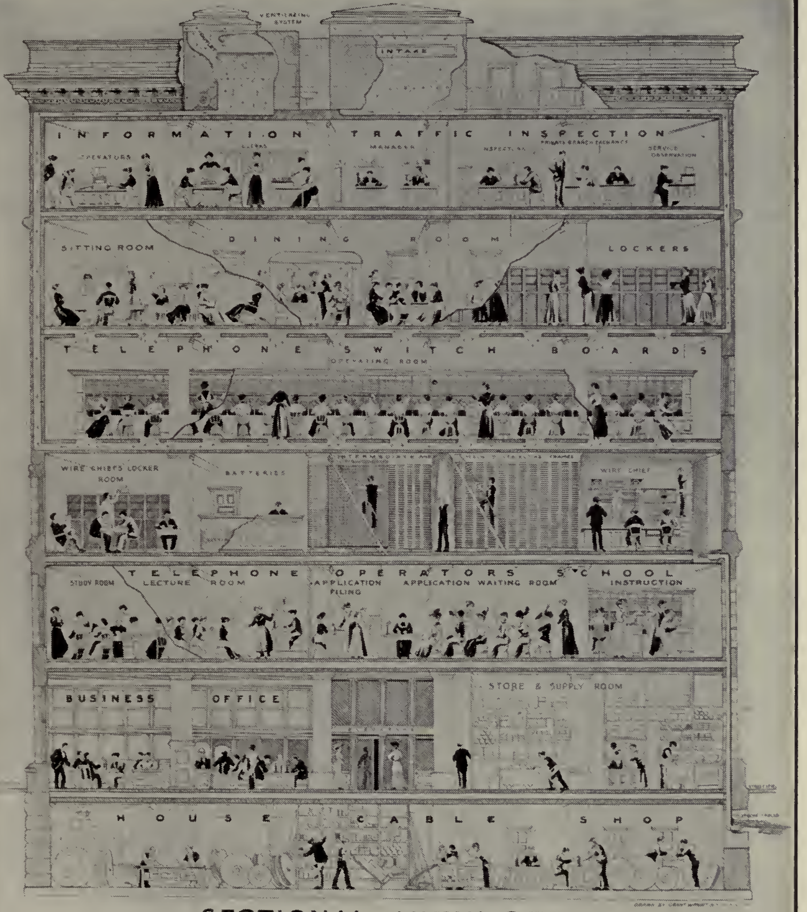
TYPICAL OPERATOR'S SITTING ROOM IN A TELEPHONE EXCHANGE.

if, for any reason, the corporation is unable to finance itself and has lost the faith of bankers and others, there is always a remedy—the application of the people for a new franchise and the finding by the public utility commission of a public necessity for a new utility to duplicate and ultimately eliminate the old. Now, my contention is that the people in this country have turned to a rational scheme of regulation; they are absolutely opposed to monopoly, governmental or otherwise; they are in favor of regulation and potential competition in the field of public utility and actual competition where same is needed to secure proper service. Potential competition is open to protect against companies which it is absolutely impossible to finance and carry on.

## Financial Efficiency of the Bell Company

In this day and age when there are so many charges and countercharges of inefficiency and dishonesty in the management of large corporations, it is refreshing to note the magnificent achievement of the Bell Company. It certainly speaks well for our President, Mr. Vail, and his able associates to know that despite the great amount of pioneering and experimental work which has been carried on in this country, and despite the further fact that the density of population is much smaller than in Europe and that distances between towns are much greater, the investment per unit for a modern, well-maintained plant, including the magnificent long distance toll line system, averages but $153 per station, while in six of the principal countries of Europe the average investment is $197 per station, or practically $44 higher per unit than ours. It is also gratifying to know that despite the great demands constantly made for new money with which to carry on the development of our industry, upward of sixty million dollars being allowed this year, the cost of money has been kept down to the remarkably low rate of 4.92 per cent. of the value of the plant and other assets. This is certainly a wonderful showing and one which should impress people with the desire to continue the present scheme of private ownership, for, surely, no governmental agency could hope to do very much better. This low cost of money has been brought about by a careful system of financing, thus, while it is true that eight per cent. is paid on certain stock, much of the money has been secured on bonds paying less than five per cent., while, by the sale of convertible bonds, more than twenty-six million dollars has been covered into the treasury of the company for which no form of security has been issued. That is the premium which the company received in exchanging its stock for the convertible bonds, producing twenty-six million dollars upon which the company pays no interest or dividend. When the public sees the improper financing and dishonesty in management of certain corporations, it should certainly, when a corporation like ours shows such wonderful results, at least accord a fair measure of support so that our management may continue to obtain money for new development at as low a cost, if not lower, for just as sure as the night follows the day, if a company is given a fair measure of support, it will be reflected in an improved condition of its credit and the ability to obtain money at a low rate of interest.

In this connection there is some solace to us in the fact that our friend, Mr. Lewis, who has been a rather prominent advocate for governmental ownership, in a recent talk before the Republican Club in this city, made the statement, "Be it said for the Bell System that it is one great corporation in our country that has not issued tons of counterfeit capital. Its stocks and bonds to-day represent the actual contributions by its shareholders in money invested in the enterprise, and we will not have that unfortunate circumstance to deal with in the valuation of that company." So we have one grain of comfort.

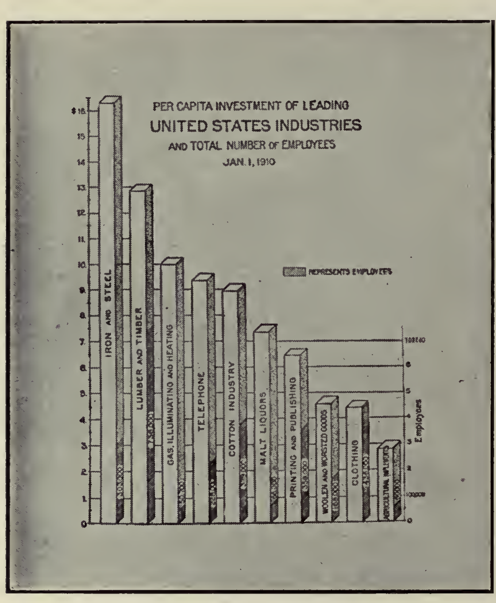


SECTIONAL VIEW OF A TELEPHONE BUILDING

## A Typical Operating Organization

The New York Company may be taken as a typical unit, and, after all, this whole question resolves around efficiency and service. In the

New York Company we have a so-called functional organization. We have three departments, the Plant, the Traffic and the Commercial. The Commercial Department of the New York Company, presided over by Mr. J. S. McCulloh—I merely mention this to show that the company is organized with men at the head of departments who have started in at the bottom of the ranks—not men who have sought and gained their positions by pull and politics or anything else—but it has been all hard knocks and experience. Mr. McCulloh has been in the business for many years. Under him he has a commercial engineer. The commercial engineer has the problems of laying out zones, rates and different classes of service. He not only takes care of the direct needs of the subscribers, but in this country we have developed a wonderful system of tie lines and leased lines between various centers. If a man in this country has a sufficient volume of traffic between two centers, he is not required to go through the exchanges, but is furnished means of connecting these centers direct.



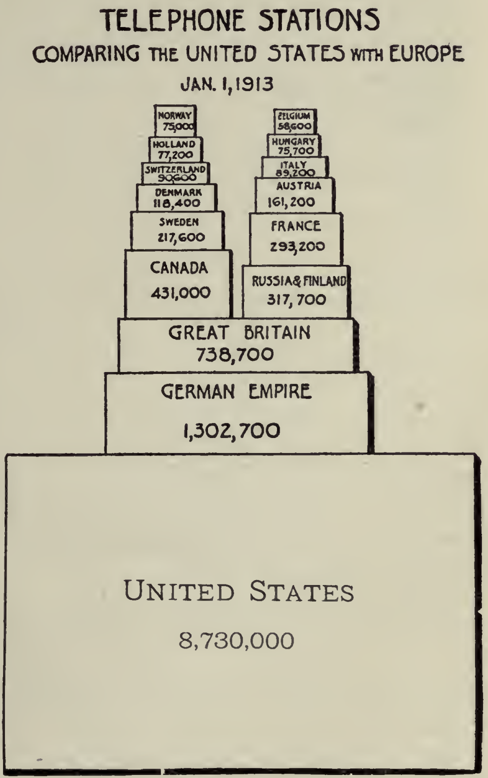
Under the Commercial Department is the advertising, selling and collecting of revenue, and also a school. In this school the commercial people are taught not only to sell telephone service, but also to prescribe for the telephone needs of the patrons, as we feel that it is absolutely essential that we prescribe the right kind of service to cover the needs of each patron.

We have the Traffic Department, which is charged with the duty of operation. And it is a pleasure to know that this department, too, is headed by a man who has grown right up in the ranks, Mr. J. H. Gordon, Jr. In the recent storms, when the transit lines were out of order, and it was difficult to get to the office and a good many men stayed home, we found the girls so loyal in the desire to discharge their duties, that they waded through the snow to the nearest offices and reported for duty there.

Recently this cable that we talked about that saved the day in the sleet storm, failed, and if you could have seen the crews that reported for duty at night, working hard to restore this cable, if you could have seen the men who went out under the direction of Mr. G. C. Allen, the veteran Plant Superintendent, going out on lonely country roads and hunting for the trouble so that the brokers could have their wires working the next morning, you would have realized what it means to have loyal, efficient men, and they are so because all through the ranks there is this idea of efficient service and no favoritism. It requires a great deal of grit and nerve, particularly in these serious breaks, such as we recently had, where in Jersey alone more than 30,000 telephones were put out of business by the storm.

The Engineering Department is presided over by one of our old and faithful employees, Mr. E. F. Sherwood, who worked his way up from an office boy to the present position of engineer. In making plans, he looks ahead as far as twenty or thirty years. In the subway work in New York you have to look out for the future. You cannot tear up the streets at frequent intervals. Upon the efficiency of his work depends the readiness for these great expansions. Just think of it, what would happen if we should ask for time to put telephones into a building like the Woolworth? If we should say to tenants moving in, "We are sorry, we cannot give you service until we move our wires in, or until we open a new central office"—because buildings of that kind take almost an entirely new central office building to take care of them.

In the Executive Department we have such veterans as the President, Mr. U. N. Bethell, the Vice-Presidents, Messrs. F. H. Bethell, H. F. Thurber and Ford Huntington, and our General Manager, Mr. J. A. Stewart, men who not only constantly study the problems in this country but who frequently study the conditions abroad so as to note every new development to be adopted or failure to be avoided. In our Mr. Walter Brown we have a Secretary and Treasurer second to none, and when it comes to accounting, our Mr. J. S. Wiley, General Auditor, is a recognized authority on his subject, and the fine and complete accounts which are made to the Interstate Commerce Commission and the State Commissions show how necessary and important this work is. You may see the results of our complete accounting methods in the Annual Reports of Mr. Vail to the Stockholders of the American Telephone and Telegraph Company. I want to urge everyone here to read carefully Mr. Vail's reports for I insist they are classics. No company in the world has ever issued finer reports, and credit is certainly due Mr. Vail for encouraging, if not inaugurating, a system of frankness in the corporation reports that should go far to offset the feeling of distrust now so prevalent against corporations.



I merely mention this to distinguish our service, and the efficiency in our service, from that of the so-called service which depends upon politics and in which there is constant change.

THE STORM OF MARCH 1, 1914, CAUSED MORE THAN $1,000,000 DAMAGE TO THE TELEPHONE PLANT IN NEW JERSEY ALONE.

## European Telephones

When we consider Europe we find, without going into endless detail, that while Europe has four times the population of the United States, it has less than one-half the number of telephones. The telegraph service in Europe, or, rather, the early signal service before the telegraph service, was founded upon military necessity. They developed visual telegraphy, that is, they had semaphores about ten miles apart, and when the weather was clear, they transmitted their signals in their military service to the different frontiers. When the telegraph came into use, they adopted this more rapid means of communication, and, again, for military necessity, and when the telephone came along, they took this new adjunct but constantly had in mind protecting the telegraph. It was a case of the relative service. The telephone in Europe was introduced practically as soon as in this country. The year following the introduction into the United States, the telephone was introduced in Europe. To-day, after all of these years of experience, we find that in many of the countries of Europe they have so-called limited or partial service. You cannot get service at all hours of the day and night, you cannot get service from your telephone to all foreign points. In many of the schedules which were filed with the Congressional Committee, are statements to the effect that toll service cannot be had from the subscribers' stations; in other words, you put in your call and walk to the central office for service. If you desire immediate service or approximately immediate service, you are compelled to pay so-called urgent rates, which are oftentimes three times the ordinary or deferred rate.

Another feature of European service which has to be borne in mind when making comparisons is that practically all the service in Europe is on a two-number basis. You cannot call for a person by name and expect to get that person or no charge, as is the case in this country when making long distance calls, but you are compelled in every instance to call by number and pay whether or not you get the party wanted.

## Limited vs. Continuous Service

In this country we look ahead and make ample provisions for the future. In foreign countries this is not the case. As indicative of the limited service in foreign countries let me say that in Switzerland only three and a half per cent. of the exchanges give continuous service, ninety-six and one-half per cent. are closed after 9 o'clock at night, forty-six per cent. are open between 7 until noon, closed two hours during the noon hour, open from 2 until 6 in the evening, closed for tea, and then opened for half an hour after 8 o'clock. (Laughter.) New Zealand, eighty-four per cent. of the exchanges are not open on Sunday, eighty per cent. of the

THE WORK OF RESTORING TELEPHONE SERVICE WAS BEGUN WHILE THE SNOW WAS STILL FALLING, AND THE BRAVERY AND LOYALTY OF THE EMPLOYEES WAS A TRIBUTE TO THE RELATIONS EXISTING BETWEEN THEM AND THE COMPANY.

exchanges are not open on holidays, and about sixty per cent. are open week days from 9 a. m. until 5 p. m. In Sweden, out of 2,063 central offices and switching stations, seventy-five give day and night service. In many of the seventy-five offices a special message charge is made for the service during the night hours. Belgium, in what is known as the Brussels group, which consists of the city of Brussels and environs, which has over one-third of the telephones of the entire country, there are twenty-three offices, of which only two are open day and night. Of the remainder, nine are open from 7 until 9 a. m., one is open until 8 p. m., and one until 7 p. m. Those which are open all night are offices within the city of Brussels. In most of the European countries the Chambers of Commerce or local municipalities have been called upon from time to time to make contributions or guarantees toward the maintenance of the lines by certain sums per annum to guarantee or assure service.

## Remarkable Conditions in Japan

REVERSE OF MEDAL AWARDED NEW YORK TELEPHONE COMPANY BY TRAVELERS INSURANCE COMPANY, 1913, FOR "GREATEST SUCCESS" IN PROTECTING EMPLOYEES.

In Tokio, Japan, there are 30,000 people awaiting service, but on account of the government having failed to prepare, they cannot have service for a considerable time. So keen is the desire for service, that to obtain it they are standing in the relation first come first served, and the rights to service are to-day traded in on the Board of Trade, and, as a matter of fact, are being willed—people have died in Tokio and willed their position to their heirs.

Another way to study foreign development, or, rather, lack of development, is as follows: In all of France, there are fewer telephones than in the city of Chicago; in all of Austria, less than in Boston; and in all of Russia, less than in the city of Philadelphia; and in all of Italy, less than Los Angeles. In the Hudson Terminal Building alone there are more telephones than in the entire country of Greece.

The gain in stations in New York City alone during 1913 was more than the entire gain in all of England. The gain in the United States during 1913, approximately 677,000 stations, almost equals the entire development to-day existing in Great Britain. With the time available, I might read you newspaper clippings, which would constitute a large volume, representing the criticism of the foreign press on service furnished in the European countries, and if any of you are interested in this matter and will give me your names, I shall be glad to give you copies of the books containing such clippings.

## Importance of Standardization

As a result of the failure of the European countries to standardize the quality of the service, it is impossible for them to have an adequate and satisfactory service. Upon that I am anxious to have you think seriously. But in this country, we have adopted standards, and we adhere to them rigidly. The result of that is we can give a satisfactory long distance service. We feel that that is the most economical way to run the telephone business. Surely the telephone company can purchase its instruments and supplies in larger quantities than individuals. Surely the telephone company can organize to install such equipment much cheaper than individuals. Surely the telephone company can maintain such equipment and surely it is desirable for you who have telephone service to have undivided responsibility when it comes to placing the blame for failure. If the rates are not correct, if the service is not what it should be, there should be remedies had, and there will be remedies had, but in this connection you are of course all aware of the present case pending before the Public Utility Commission governing the New York City rates, and I am anxious to say that the company in that situation has made the statement time and time again that it welcomes a readjustment of its rates.

OBVERSE OF MEDAL AWARDED NEW YORK TELEPHONE COMPANY.

The telephone company is not in a position to play favorites, nor does it want to play favorites. All of its subscribers and all of the business interests it hopes to have as friends, and when it comes to a momentous question of the revision of the rates, now that the people have clothed the Public Utility Commissions with power and discretion, we merely ask that such commission exercise such power in the interests of all the subscribers. And, in the meantime, the company, as you know, has made reductions to remove any thought that it is seeking delay.

## Service and Government

So far as Government ownership is concerned, the whole problem, it seems to me, must hinge upon service. The stockholders have been assured by every one who has taken up the question that they will get ample return should the Government decide to take the properties over, and, while they might have the annoyance of changing their form of investment, I am sure the bankers could help them out, and they would not be pitied very much, but the whole question must come right down to the bedrock of service.

As Mr. Leach said in his introduction, this whole question hinges upon this marvelous service which to-day is no longer a fad but an absolute necessity in business. When your exchange or some part of your exchange goes out of business for a few moments, you learn the value of the service. When it came to the service problem, I purposely dwelt upon the fact that our organization is one that has grown up from the ranks, and because of this we are in a position to render an efficient service. When you look at the Government service, however, without desiring to be critical, we know that the tenure of office of those who manage the departments of the Government is, to say the least, somewhat uncertain. Changes occur very frequently. We may pride ourselves that this country is more progressive than foreign countries and for that reason can escape the unfortunate experience of those countries in managing government telephones. But when we stop to think that the foreign governments, which have made a dismal failure of their telephone systems, have made wonderful successes in their purely and concededly governmental functions, we must conclude otherwise. Think of the wonderful roadways of France, England and Germany. There is no scandal in connection with their building and maintenance. There has been no call for interminable bond issues and all kinds of excitement. Think of the harbors of the foreign countries, if you please, the market places, and all of the so-called purely governmental functions. They are wonders. But when these countries invaded private enterprises, when they left the true realm of government, when they entered into these paternalistic propositions, they dismally failed. Our idea here is that that government is best which governs least. And to the extent that our Government is less stable than that abroad, to the extent that we have not such strong forms of government, my conviction is that should the Government here enter the realm of private enterprise, the failure would be more dismal, more complete.

There have been considerable comparisons of rates made in talks and in newspaper articles. The rates, of course, have been compared in peculiar ways. All sorts of assumptions have been made. Men have gotten up and have glibly stated that if the Government took over telephones the service would be much cheaper, and their statements have been accepted by some. But as a matter of fact, there is no possiblity of making fair comparisons unless you are prepared to consider everything that tends to make a fair comparison. What is the use of talking about rates in Switzerland if you find that in Switzerland, in order to get service, you have to make special payments or pay for part of the construction itself? What is the use of talking about that service if you cannot get it at night or only during certain hours of the day? When you come right down to facts, the service cost in this country is less than that in the countries abroad.

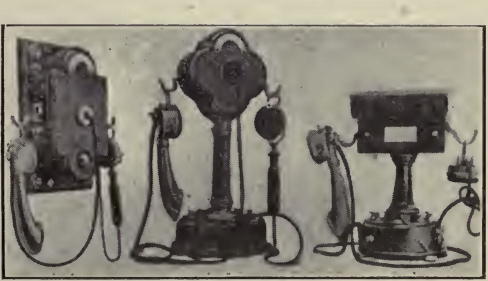
The comparisons have been made by taking our highest rates instead of our lowest or average rates. In this country we have built up a system of rates, which have proven to be the right rates because they have developed the business.

## An Auditor's Report on the Post Office

So far as the company is concerned, while we talk about a company in the sense that it seems to be something disassociated from the people in the country, our stockholders now number more than 50,000, and most of them are women, good, hard-headed, saving New England women. They are the ones who own the stock of the company. When it comes to talking about a constructive program, the point I wish to bring out in closing is that in the Post Office Department, we do not wish to criticize the Post Office Department so long as comparisons are not made with foreign countries or with our industry, but when the Post Office Department or its champions profess to show that we are not efficient, profess to convict our own men and women here in this country who are working so hard to give you good service, and profess to show that we are only one-third as efficient as the Norwegians, then we somewhat resent it, particularly in view of the following indictment of the Post Office Department by Henry A. Castle, then Auditor of the Post Office Department:

ABOUT 150 DIFFERENT TYPES OF TELEPHONE INSTRUMENTS ARE "APPROVED" BY THE FRENCH GOVERNMENT, WHICH FURNISHED ONLY CONNECTIONS AND SERVICE.

> "As now managed the Post Office Department has no plant whatever. All it owns in the way of personal property is mail bags, mail locks, letter boxes, carriers' bags and a few similar inconsequential items. Even in public buildings it is the tenant of the Treasury Department.
>
> "Here is disclosed a very large expenditure which never figures in computing a postal surplus or deficit. In all cities the United States owns imposing structures, where the local post office and all other branches of the Department have their capacious and luxurious homes without cost of the postal revenues. The buildings are constructed and paid for by appropriations expended under the direction of the Treasury Department, no part of which is charged against postal revenues. No rentals are ever collected or computed. More than this, all expenditures for heating, lighting, repairs, janitor service and supplies, are paid for from other appropriations. The aggregate of all these items, including a fair rental for quarters occupied, would amount to several millions of dollars annually. * * *



SUBSCRIBERS IN FRANCE MAY PURCHASE ANY STYLE OF TELEPHONE INSTRUMENT THEY LIKE, THERE BEING NO STANDARD AS IN AMERICA.

> "In addition to this should be mentioned the cost of the Post Office Department at Washington, and of the Auditor's Office, em-

> bracing salaries of more than a thousand officials and employees, which are paid from appropriations for what is termed legislative, executive and judicial service, and never appear in postal estimates, amounts or balances."

The thought I have in mind is that if the gentlemen who are talking of putting our industry under the Post Office Department would clean house, so to speak, if they would establish a condition in the Post Office Department so that proper accounting methods could be introduced, the Postmaster-General given some permanency of tenure, the staff appointed because of efficiency, the local postmasters appointed because of their special fitness and knowledge, and not as was recently the case over in New Jersey where, as a result of a scramble for the Postmastership, one of the senators suggested that all shake dice and determine which one should have the position.

When they have established the condition of which I have spoken, then we may all be interested in considering the advisability of public ownership, but until that time it seems to me it is farfetched. Surely, with the regulation we now have, you and every other good citizen must assume the rates to be right. If they are not right, they should be made right. There is no economy which the Government can introduce unless its organization first be made to manage its present operations efficiently.

And right in our own town there is a movement typical of the whole situation. As you know, the Merchants' Association of this city was largely instrumental in bringing to pass the Parcel Post. It was introduced to fill a want. It was found that these rural mail wagons were going over the country with perhaps one-fifth of their carrying capacity. The Merchants' Association favored the introduction of the Parcel Post to make for efficiency and not to destroy. Furthermore, they went before the Interstate Commerce Commission and secured the order revising the express rates. They wanted them revised. It was right they should be. They were revised and rearranged. But they did not want to destroy anything which made for efficiency.

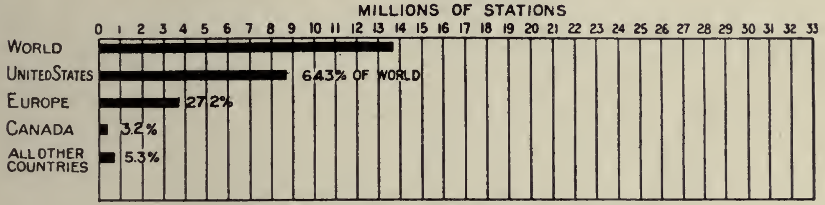
Now, that same organization is battling nobly to prevent the Government from destroying the express companies. It is foolhardy for the Government to ruin the express companies with nothing to take their place. They have a sphere to fill.

## Seeds of Industry

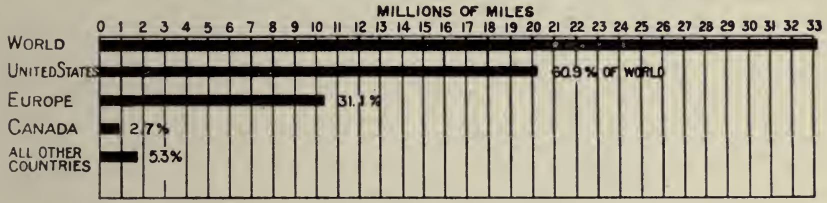
It seems to me that in this present time of agitation and unrest the men of the Y. M. C. A. and the thinking men of the country must appreciate that what our industries need above all, to operate successfully, is a need of confidence, and a surcease from this constant attack. No industry objects to regulation, no industry objects to investigation, no industry objects to an insistence that the charges and the methods be right, but it certainly is unfair to keep hammering and hammering for changes and reductions in the absence of thorough investigation. It is unfair to keep up this constant agitation, it is unfair to permit men on the platform to get up and make statements that they can do this and that, that they can save a million dollars a day or cut rates in half. All they need to do is to make the bald statement, and, regardless of how absurd their declarations are, or how improbable, there are some who will always applaud.

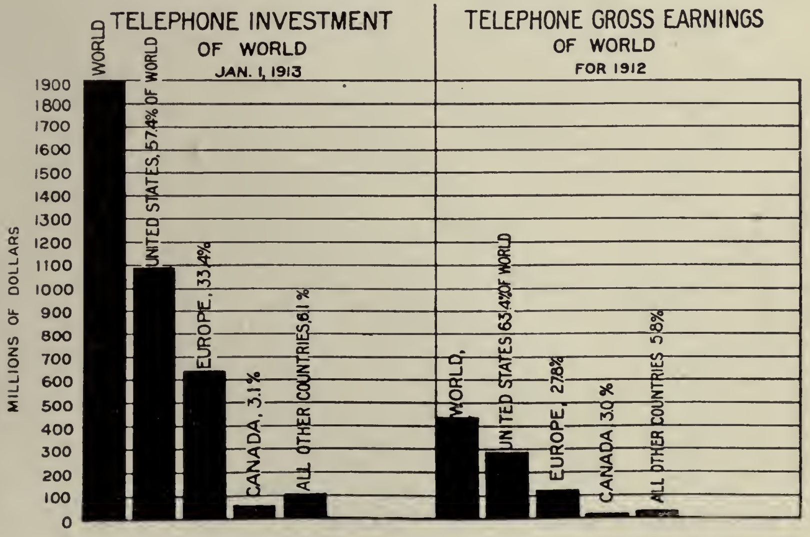
I say if people want reduced rates and improved service they have it in their hands to help us. If they will show a measure of confidence in the institutions of the country (let me tell you I believe in the institutions of our country thoroughly), if they will show a measure of confidence so that when we go to the bankers of the country we can say, "We have the people back of us, sane and sober in their criticism but upholding and insisting at all times on orderly procedure," we shall be able to get all the money we need and get it very cheap. And that to me seems to be the whole problem. I am not alarmed. The whole proposition is to get the American people thinking and thinking right, and the proposition will take care of itself. I thank you.

TELEPHONE STATIONS OF THE WORLD, JAN. 1, 1913.

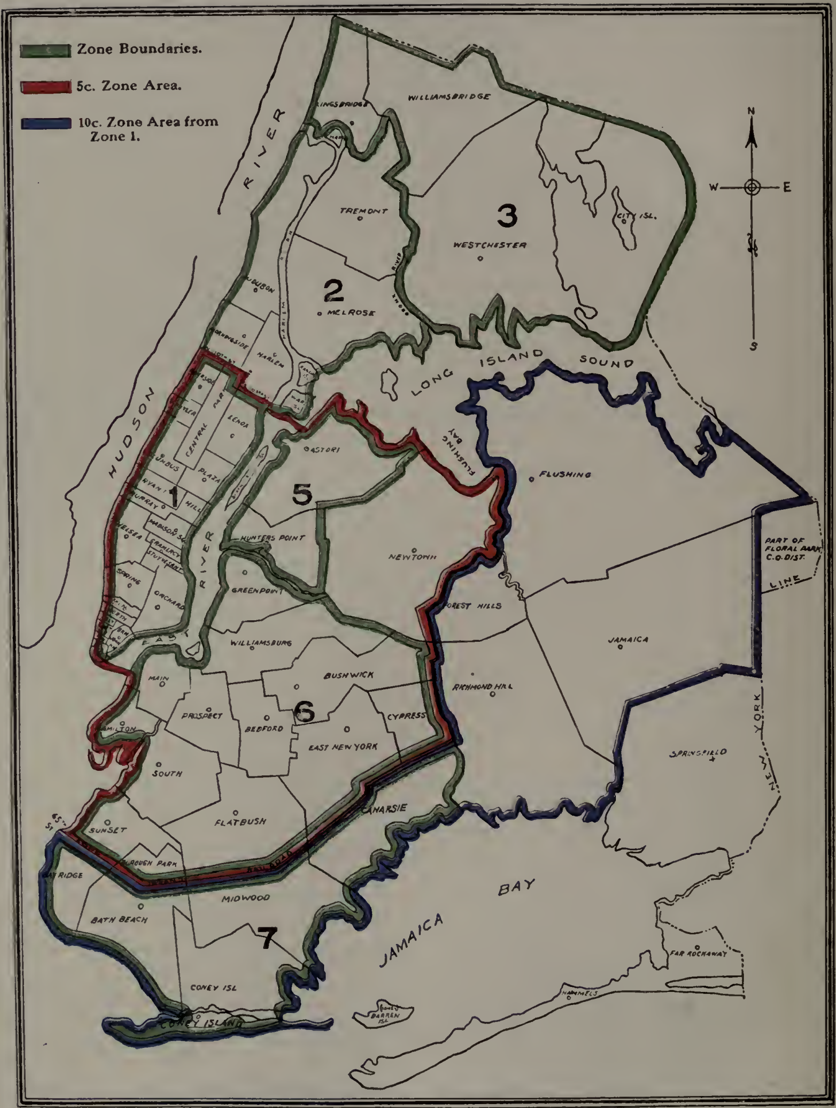


TELEPHONE WIRE OF THE WORLD, JAN. 1, 1913.




TELEPHONE INVESTMENT OF WORLD JAN. 1, 1913

TELEPHONE GROSS EARNINGS OF WORLD FOR 1912



ZONE MAP OF REDUCED TOLL RATES IN NEW YORK CITY AND VICINITY.

# Future of Public Utilities

### By Thomas N. McCarter

A day or so ago I met an acquaintance on Fifth Avenue who stopped and said, in a quizzical sort of way, "I understand you are going to address the Finance Forum of the Young Men's Christian Association on Monday night." He did not say, but he looked, "Aren't you wasting your time?" I said to him, "Yes, I am—not wasting my time—but I am going to address the body of which you speak."

We complain that we are not receiving a fair deal, that every man's hand is against us. If we refuse the opportunity presented to us to speak to an intelligent audience and tell them our side of the story, we seem, to me, to have nobody to blame but ourselves if our case is misunderstood.

They tell a story of Mr. Beecher—Henry Ward Beecher—in the Civil War, that when everything was dark and the North was fearful that England was going to recognize the Confederacy, in its extremity, the Government sent that great orator, Mr. Beecher, to Europe, to stem the tide.

On the night of his arrival, he addressed an enormous and hostile audience in the City of Liverpool, and in that peculiar, inimitable, English fashion which lasts until the present day, caring nothing for Mr. Beecher, they began to heckle him and embarrass him. His eye lighted on a man who seemed to be listening, sitting in one of the front rows, and fastening his eye on him he said, "You listen to me," and he kept talking to this one man and gradually, by dint of the great mind of that wonderful clergyman, and with his power of eloquence, he drew more and more of the audience to him, until the meeting ended in an ovation for Mr. Beecher.

I have not such power of eloquence as had Mr. Beecher, nor any such persuasive way, but I have reasons for the faith that is in me, and I am glad of the opportunity to meet an audience so largely composed of young men who, as the days go on, will be the older men and the deciding men of a great metropolis like New York, and state my reasons for this faith that is in me.

Two years ago I had the honor of being President of the American Electric Railway Association of this country, and under the auspices of that Association, I, in company with a considerable number of earnest men, took a trip through the country at considerable sacrifice to ourselves (although there were many pleasant features attached to it too) to tell the people in the various cities to which we went, these very same reasons for the faith that was in us. I personally made twenty-eight speeches in nearly as many nights in all the prominent cities of this country, stretching as far as the Pacific Coast. I don't know whether it did any good or not. It was an expensive trip to the Association and it was an expensive trip to us in that it took so much of our time, and it is difficult to say what it accomplished. Judging from the temper of the American people then and ever since, I should rather hesitate to say that the preaching of that Gospel by us had evangelized the nation, but nevertheless I have never regretted the trip. I feel that I did my duty, and that it was a privilege to make the experiment, as it is a privilege to be with you here tonight.

## The Corporation Manager

Now, at the outset, I want to register my protest against one seemingly well-recognized theory of today, and that is that no man who is in my line of business is worth listening to; that no such man can be honest in his expression of opinion; that he is tarred with a corporate stick; that he is a sort of leprous animal allowed to be loose, but who, for the public good, should be confined; that no man who is at the head of a large corporation, especially one concerned with public utilities, can have an open mind about the questions that affect this country. I deny the proposition *in toto*. The record of history disproves the whole contention. In the common acceptation of the term "public utility," few of them existed at the time of the Civil War, but the railroads existed at the time of the Civil War, and the history of that war shows there was no more loyal body of men than those who directed the railroads. Thousands of them laid down their jobs in the railroads and went to the war, and those who remained to manage the railroads managed them through all that teribile crisis—first in the interest of their country, and after that in the interest of the railroads—and I say to you of today that I know the men who are engaged in the public utility business of this country throughout the land, and I do not believe there is a more loyal, patriotic, or honest set of men in any employment in this country, than is to be found shaping and directing the policy of these great public utilities that have sprung up within the last thirty or forty years.

Prior to my advent in this kind of work, I occupied several political positions of importance in my State. I do not believe today that I could be elected to any office, however meagre or insignificant, simply because I occupy the position I do. I have no political ambition, but I protest against that condition of affairs. I am no better or no worse than any other man engaged in any honorable occupation, and I am just as patriotic and just as good and no better than any one of you. And I protest with all the vigor that is in me against the theory that has grown up, that no man connected with large matters of finance or with large corporate transactions can have a soul in his body or a love for his country.

## Politics and Utilities

As I see it, the politics of this country are going through a very severe metamorphosis. The Democratic party was formed over a century ago with its foot planted on the rock of State Rights. The Republican party was formed in 1856 as the shadows of war between the sections were gathering, to save the Union at any cost, and incidentally to restrict, not to abolish, slavery. The Republican party triumphed in that great contest, and has lived to perform signal benefit to the country ever since. I myself am a Republican by sentiment and tradition, but if I see rightly, the old political standards have passed away.

Why I am a Republican now it would be a little hard for me to say. If it be true that the tariff question is settled—and about that we may differ —if it be true that the country has gone permanently on a tariff-for-revenue-only basis, there does not seem to be much left of the Ark of the Covenant, so far as the Republican party is concerned.

With regard to the Democratic party, the old States Rights doctrine is forgotten. Now we have Democrats with progressive leanings, Republicans with progressive leanings, Democrats who are conservatives, Republicans who are conservatives, then we have Progressives pure and simple, and we have Socialists, and as I view the signs of the times, the country is in a state, politically speaking, where men have not quite found themselves, but where they will eventually arrive either in the camp of Radicals or in the camp of Conservatives. So far as I am concerned, the sooner that time comes about, the better it will be for the country, even though that party to which I shall belong, does not prevail.

I think at present our political existence is rather hybrid. I think we would be better off if the line of demarcation and the line of cleavage were sharply drawn between the Conservatives on the one side and the Radicals on the other, and that, gentlemen, is the prediction that I make of the political future of this country. It is not new—England has had it in one form or another for a good many years, and it is more or less true of the German situation today.

Now, then, if I am right in saying that sooner or later such will be the line-up, then the fact will be that when the decks are cleared for action and the parties have braced themselves for the fray, they will fundamentally, in my judgment, disagree upon the proper attitude of the country toward public utilities. For the purposes of this discussion I mean by public utilities all those street-using corporations that operate under grants from the State or the municipalities thereof; the commonly accepted utilities, such as gas, electric light and power, and street railways, telephones and telegraphs. I do not include the railroads, for though they are of a quasi-public character, they differ from the ordinary public utility in that they operate almost exclusively on private rights of way for which they have paid, whereas the public utility operates not altogether, but quite largely, in the public streets, under a franchise of the character that I have spoken of.

Much that I will have to say will be as true of the railroads as it is of the class of corporations with which I am more particularly concerned, but my remarks are in the first instance applicable to public utilities, as I have tried to define them.

Now, in this difference of opinion that will arise between these two schools of thought, one or the other must ultimately prevail. It will be my endeavor tonight to place plainly, and, unfortunately, dryly before you, because the subject does not admit of levity or of anything but seriousness—it will be my endeavor to place before you the fundamental problems connected with the operation, in future, of public utilities and endeavor to show you which of the two schools of thought I think should prevail.

## Fundamentals

Now, the fundamentals, as I call them, with regard to the operation of public utilities are four:

First, the regulation of public utilities;

Second, the rate of return that should be allowed to public utilities;

Third, the character of future franchises that should be granted to new public utilities or to existing public utilities for new territory;

Fourth, the question of Municipal Ownership so far as it affects the operation of public utilities.

This is indeed a broad program, and the very statement of it must necessarily demonstrate to you that the discussion tonight must be of a limited character to be kept within the prescribed time that I can hope to detain you.

### Cost of Regulation

First, with regard to the regulation of public utilities. All agree, both Radicals and Conservatives, so far as I know now, upon the principle of regulation, and yet I say that with certain misgivings. The two Public Service Commissions of New York State, the so-called New York City Commission and the so-called Up-State Commission, are spending, in the exercise of their functions, about three million dollars a year of the taxpayers' money. It is very well to have somebody to curb these so-called rapacious corporations. It is very well to see that watered securities are not issued in the future, but it will take sixty millions of those securities at five per cent. interest that must be wiped out before these commissions have paid their freight. Three million dollars a year is a very large sum to spend for an idea.

In 1906 Congress bestowed upon the Interstate Commerce Commission the power to regulate rates. Newman Erb, the President of the Minneapolis & St. Louis Railroad, has shown in a very forceful statement which he has put out within the last week, that since the day the Hepburn Bill granted to the Interstate Commission the power to regulate rates, the value of American railroad shares in this country has shrunk three billions of dollars.

Maybe they were too high before. I don't know. Maybe there are other causes than rate regulation that have contributed to their depression, but it makes one stop and think if when in one State we are paying three million dollars a year for the privilege of contributing to a recession in value of three billion dollars, whether or not we are on the right track.

Nevertheless I say that with those mental reservations all are now agreed that the policy of regulation is probably a safe policy which should be acquiesced in by the public and corporations alike, and yet the Conservative will impose upon his concurrence in that point of view, two conditions, first, that these commissions, if they are to continue to exercise control over these great problems, must be composed of high-toned, honest men—not grafters, not politicians who care nothing about the properties, not college professors, not theorists who don't know what they are talking about, but high-toned men of experience who will bring to the consideration of the problems before them a fair, honest and unbiased judgment, and secondly, that the laws under which these commissions are created, shall confine these men to their jobs, and shall limit the powers that they may exercise.

It is all well enough that they shall have the power to require adequate service, it is all well enough, perhaps, that they should have the power to regulate rates, but when it comes to giving these men plenary powers to substitute their judgment for that of the Board of Directors constituted by the stockholders who have invested their money in the enterprise, it is fatal to the success of the operation of these properties, it is the worst kind of Municipal Ownership, for it is Municipal Ownership without financial responsibility. (Applause.)

So much for the principle of regulation in general, in which I concur with the mental reservations which I have expressed.

## Conservatives and Radicals

Now we come to the question of the proper rate of return that should be allowed to these companies, and here the two schools of thought, *i. e.*—Radical and Conservative—are as far apart as the poles. The Radical will say to you, "Let these properties be valued as to their physical assets alone, let that amount when so ascertained be depleted by the amount of the depreciation that the property has suffered, and on the basis thus found, we will allow you to earn six per cent. interest."

That is practically the doctrine of Senator La Follette Senator La Follette says that the steam railroads of this country are capitalized at thirteen billions of dollars, that they could be reproduced for seven billions, hence, there is six billions of water in them. Now, I don't know at what the railroads are capitalized, nor do I know what they could be reproduced for, and I don't believe Senator La Follette knows. It is a matter that will take years to ascertain, if any practical good can come out of such an ascertainment, but Senator La Follette's plan is to squeeze the six billions out, and to start by allowing six per cent. on the seven billions which he admits the railroads have cost.

Well, now, that doctrine was so answered by the late Senator Dryden, of New Jersey, in language that is so apt and so much better than I could express it, that with your permission, I will read a short extract:

## Senator Dryden's Reply

"Senator La Follette has stated that the railway securities which would be affected by his proposition amount to about thirteen billions"—billions, not millions. We are talking in large figures now. "Out of this amount he expected to squeeze about seven billions." I was mistaken; I said six; he wants to squeeze out seven. "These thirteen billions of railroad securities, as is known by every intelligent man, have been sold at home and abroad. There is not a financial market on earth where they may not be found, and they have been bought by investors of all classes, and in every class of life. They are the foundation of the happiness, comfort and prosperity of countless numbers of people. To destroy seven billions of these securities by legislative enactment would constitute the most gigantic robbery ever conceived by the mind of man If it would stand the test of the Supreme Court, it would constitute confiscation by act of the Government and enforce repudiation by the railways themselves. Its consummation would leave behind it a path of ruin the width of which and the length of which no man could prophesy. It would bankrupt life insurance companies and savings banks, it would cripple banks of deposits and trust companies. It would destroy estates held in trust for widows and orphans. It would beggar rich and poor alike who have invested their money in these securities. It would paralyze business. It would destroy American credit in every financial center of the world. There is not a home in America so humble that this thing would not throw its baneful shadow across its hearthstone."

Now, gentlemen, do we propose to do anything like that? During the administration of President Taft, he appointed a commission to study the whole railroad security situation. That commission was composed of five gentlemen, most carefully selected, the Chairman of which was President Hadley of Yale, and in the report of that commission, written by President Hadley and acquiesced in by all the commission, they say that the repudiation of American securities is unthinkable in this day and generation.

And if you did it you would not catch the fellow you were after. Suppose it be true that these securities were watered in the early days. So far as the railroads are concerned, I am inclined to think, though I state with no such positiveness as does Senator La Follette, that by accretions to the value of their properties, the railroads have long since made up whatever of water was injected into their property. But if they find there is water still in their property, you would not catch the man with the water in his pocket. He sold it long ago. The dear public, you and I, and the rest of us, have got that, and he has gone scot free.

It was notorious some years ago that when a rich gentleman in this town who had been largely connected with the street railway systems of this city—which we all admit were scandalously managed—died, he left not a share of it.

But what about the man who has come along since the re-awakening of sentiment on this subject, and the absolute stopping of the injection of water in these enterprises now about ten or fifteen years ago? What about the rest of us who have been putting money in ever since, good money? In your search for the man who got away with the goods, you would not hurt him, you would hurt us, because all these early performances—if reprehensible performances they were—are protected now by leases and by mergers, and by this, that and the other. The new money has gone in on top of theirs, and the new money in any scheme of paring down securities would be the first to go.

## The Conservative View

Now, the Conservative differing from the Radical position of Senator La Follette, says, "It is true that there were probably scandals in connection with this business in its early days, but we will not take the risk of creating a greater evil in trying to reform a lesser one. We will let bygones be bygones. We will accept the situation as we find it. We will see that nothing of the kind is done in the future, but we will protect the securities that have been issued under the forms of law, while the State stood by and said nothing, while the State took the money that was paid by these companies for their certificates of incorporation, while many of the men who are now prating about the immorality of it all were grasping to get on board the good thing they then thought it was. We will let bygones be bygones, but we will regulate these properties in the future so that there can be no over-capitalization, so that there only can be allowed a fair return upon a legitimate investment."

## What Return Is Fair?

Now, what is a fair return upon a legitimate investment for a property of this character? Well, I don't know. I cannot say under all conditions and under all circumstances what it should be, but I know that it should not be less than, say, eight per cent. Why in the world should I invest money in a hazardous enterprise that may take years to work up to an interest-paying basis, only to find that when I have reached the interest-paying basis of six per cent., I am precluded forever from making any more, when all the time I can get a five or a six per cent. mortgage or a five or a six per cent. investment of a different character, that will be absolutely safe without any other risk, or I can leave my money in the savings bank and draw four per cent. and rest securely at home?

Take an instance right at hand. Some years ago some gentlemen conceived the idea of building the Hudson Tunnels under the Hudson River. I have not a dollar's worth of interest in that enterprise, but I am a Jersey man, and I do know that no other thing that has ever been done has conferred the boon upon New Jersey as has the construction of those tunnels and their subsequent operation. Everybody knows it has been a financial failure. The properties have had to be re-organized or readjusted, as they preferred to call it, and the capitalization has had to be pared down, and bonds were issued for the cost of the property and only for the cost of the property, and they have not been able to earn the interest on that.

Why on earth should any man put his money in the bowels of the Hudson River for the privilege of connecting up these two States and go through the lean years that the gentlemen who put their money in that enterprise are going through now, only to be told when they ever get up to the point, if they can ever do so, that they may only earn six per cent., and that that is all there is in it?

It simply means that no such enterprises will be built in the future, if that is to be the law. No man with any sense would make an investment of that character.

Now the Conservative says, not six per cent. on the bare bones of the physical property, as is the expression extremists like Senator La Follette use, but not less than eight per cent. on the full value of the property, not only the bare bones, but the bare bones plus the overhead charges; the bare bones plus the cost of development, and those other items of intangible value that every man who has had practical experience in large business affairs knows go with his business, and that to ignore these items of intangible value is just as unfair as it would be to ignore the price of any piece of real estate or any piece of physical property which it is perfectly possible to put your hand on. And in the case of franchises that have been granted in the past and capitalized, so, too, the value of the franchise must be allowed, and the Supreme Court of the United States to the Consolidated Gas Company of this city, allowed as an element of value in the famous eighty cent gas case, the franchises of the New York Consolidated Company to the extent of seven millions and a half, which almost caused men of the character of Senator La Follette to foam at the mouth.

## Franchise Values

We have a case in New Jersey now that involves the same problems very largely. There, our commission in the so-called Passaic Gas case, allowed us the items of the intangible value that I have spoken of, but refused to allow us any franchise value. We think that they violated the principle of the Consolidated Gas Company case, and will be reversed by the courts. Whether we are right or not remains to be seen, but one thing about it is curious, and it shows very well the signs of the times and the temper of this country.

The guiding spirit of the New Jersey Commission for the last few years has been Professor Daniels, a very able man, formerly a professor of Princeton, and incidentally, a classmate of mine many years ago at Princeton. It was he who allowed these intangible values, but who repudiated the franchise value. We are fighting that decision with all the strength that we have, on the theory that he did us the scantest kind of justice, but in the meantime Mr. Daniels has been appointed a member of the Interstate Commerce Commission by President Wilson, and his confirmation was nearly upset because he did allow us those intangible items of value. The Senate hesitated to confirm him, and only did confirm him under the whip administered by the Administration, so that the poor fellow was between the upper and the nether millstone. (Laughter.)

## President Wilson's Answer

I have never heard a better exposition of this whole subject of which we are now speaking than that given by President Wilson himself. When he ran for Governor of New Jersey some two or three years ago, a Radical in the State propounded this question to him in an open letter: "Do you believe that all the public utilities of New Jersey ought to be valued with regard to their physical property alone, and on the value thus found, rates should be fixed, which should allow them six per cent. on that value?" To which President Wilson replied in his usual characteristically consummate use of English: "No. I believe that physical value has an important bearing upon the question, but I also think that all the physical, financial and economic circumstances should be considered in connection therewith."

That expresses the whole story in a nutshell. But people say, "Why should you be allowed anything for these franchises that have been given you? You never paid anything for them. They were presented to you by the Government. Therefore why capitalize them against the Government?"

Well, a good many years ago when the Government at Washington was anxious to have a trans-continental railroad built to the Pacific Coast, they not only gave the Union Pacific Railroad a right of way, but as an inducement to men to invest in that enterprise and to build that railroad, they gave them thousands of acres of land adjacent to the right of way, which made the Union Pacific Railroad and those who went into the Union Pacific Railroad, ultimately, very rich. Does it lie in the Government's mouth today to say, "Let us have that land back. We gave it to you. It did not cost you anything. Give it to us."

The Supreme Court of the United States has held distinctly that it makes no difference. It was an absolute conveyance, given for a valid consideration, and so were these franchises in the early days, now so much discussed, then so much despised. Who supposed fitfy or seventy-five years ago that men were going to get enormously rich from rights given to lay a gaspipe in a public highway? The gas industry is over seventy-five years old, a little bit older. Who supposed thirty years ago, when the dawn of electricity began, that the franchises to distribute this electric light and power were going to be of any practical value? Who thought that these old horse car franchises would ultimately develop into engines of wealth? Who wants today a franchise for a flying machine? Who would take it as a gift? And yet it is no more absurd to suppose twenty-five or fifty years hence some right now given of that character may be as valuable as the rights that have developed in the utilities which, in the lapse of time, have become everyday household words. (Applause.)

**Future Franchises**

Now I pass on to the question of the proper character, as I view it, of future franchises. Of course, in a sense, this is locking the stable door after the horse has gone out, because most of the franchises have been given in the past, unless, as I say, some new inventions like flying machines or something of that sort, will come in to revolutionize the world. If the theory which I have evolved is sound, that regulation is here to stay, and that one part of that regulation will be to limit these companies to a minimum earning capacity, we will say, of eight per cent. on the fair value of the property devoted to the public use, which is the language which the courts use—then I say the question of franchises becomes relatively unimportant.

Now, if I may go back a moment. Why I say eight per cent. is this: For reasons I have tried to indicate, you won't be able to get the money if a less return be paid. The private investor is an investor in these enterprises because he sees a probability of return larger than the usual rate of return, and I tried to illustrate it by the Hudson River Tunnel incident and others. If it be found that eight per cent. is a minimum rate which can be held out to the man to invite him to go into these enterprises—and do not for a moment lose sight of the fact that it is of the greatest benefit in the world that men should be invited into these enterprises which have contributed so much to the development of this country—let us be in a position to offer him the inducement that will attract him. Of course, here in New York it is a little different. Manhattan Island is a small geographical unit with an enormous population favored wonderfully in the development of nature by the water that surrounds it. But take the cities of the country generally speaking. Take the City of Newark as a fair example. The City of Newark has now possibly 400,000 people in it. Within the short span of my life, I have seen it grow from a country village of approximately 100,000 people, and I tell you that nothing in the world has so contributed to the growth of that city—and what is true of it is true of hundreds and hundreds of cities larger and smaller, as we go West—as has the development of cheap trolley service. They have made it possible for the man of small means to leave the congested centers and the tenements and the flats in the center of a congested population, and live in the outskirts of the town, in his own home. They have caused these towns to flourish, as the rose, to double in population far more quickly than they otherwise would have done, and this, in turn, has increased the amount of tax ratables, and has increased the wealth of all the communities, and I say without fear of contradiction that the chief determining factor in the development of the average city in this country within the last twenty-five years has been the development of the city and suburban street railway service.

## Length of Franchises

Now, then, what should be the character of franchises to be granted in the future? To start with, I agree right away that we shall have no more unrestricted perpetual franchises to be exploited at the expense of the public. I want no more Metropolitan Traction scandals in this country. I want nothing that will not stand the light of day, and if you start with a commission that will regulate these franchises, will regulate these properties, and will regulate their earnings to a minimum of eight per cent. on the actual money that goes into them now—start with the idea that hereafter franchises are not to be capitalized except to the extent of the allowance of eight per cent. If they start with that theory, it does not seem to me to make very much difference to the public interest for how long a term a franchise is granted, while it makes a vast difference to the utilities. Your Radical says "twenty years is enough for these companies. We will show them. Twenty years of life, and then we will see what will happen."

Gentlemen, that simply means again that these properties won't be extended, and the communities will not grow in the next fifteen or twenty years as they have grown in the past.

Suppose you rented a piece of property on Broadway, and the property was vacant and you took that property on a twenty year lease, and then, without any further right to occupy the premises at the end of twenty years, you put a building on that property that cost $100,000. Would not any prudent man sinking-fund that investment every year to the extent of five thousand dollars, so that at the end of the twenty years he would at least get his bait back? Now, if franchises, involving a large expenditure of money after they are granted, are to be limited to any set period of time, the same principle must be followed.

## The Perpetual Franchise

My own thought is, though I appreciate fully the bygone evils of unrestricted perpetual franchises, that now that public sentiment has crystallized in favor of the regulation and has or will crystallize in favor of a certain minimum earning to which these companies shall be entitled, that the franchises might as well be perpetual as not, because the right of regulation is reserved, and so is the right of condemnation by the municipality or the state, in case that the utility should ever be taken for public use, so that to me this hue and cry about the length of the franchises under present-day conditions has outlived its usefulness. I don't wonder the public was stirred up.

I don't wonder that they resolved there should be no repetition of certain things that took place, but those things have been forever taken out of the realm of possibilities and are not affected by the regulation of franchises and their terms. If franchises are to be limited, they should be either one of two things. Either they should be perpetual, providing for certain periodic times at which the terms of enjoyment of those franchises should be recast by agreement between the municipality and the company, or, failing of agreement, by arbitration; or else if they are to be actually limited in time, then the period of time should be so long that the sinking fund payment will not be a burden upon the present generation. By that I mean this: Operating expenses must be paid by the people in rates, taxes must be paid by the people in rates; sinking fund charges must be paid by the people in rates; and the shorter time you limit the franchise, the larger the sinking fund payment, hence, the larger rate paid by this generation of the public.

### The Twenty Year Term

But some people will say, it is perfectly simple—it is perfectly safe to take a twenty year franchise and then gamble on what happens at the end of the twenty years. Well, it is not safe to do anything of the kind, as experience has shown. Recall Cleveland, with Tom Johnson and his experiments; Toledo, now going through chaos, with expiring franchises and Chicago, which went through a most trying experience for many years upon the expiration of the franchises, during which, as always happens under similar circumstances, the owners of the property, not knowing what the public had in store for them, let their properties depreciate until the service was wretched and intolerable.

Expiring franchises, in the last years of their life, do no one any good. The company does not dare spend money on maintenance, it does not dare spend money on betterment, it knows not what the public has in store for it, and the public is exasperated by reason of the failure to spend money. How much better that the life should run on indefinitely until such time, if ever, as the public sees fit to take over the property, and then have them pay a fair price on the property, a fair price estimated, if you please, on the minimum earnings which the company is allowed to make?

Now, gentlemen, I pass on—I warned you that this would be dry before I started in—of necessity it must be dry, so I will hasten on, not to weary you.

### A Governor's Comment

I pass to the fourth fundamental factor, as I call it, the question of the operation of public utilities. That is the question of Municipal Ownership. These Radicals are never satisfied. I remember when I was in the Legislature at Trenton, the then Governor of New Jersey sent for me one day and said, "You are making a very great mistake" in opposing a crazy bill introduced by a man who shall be nameless, which was very radical. I said, "Why, Governor, you don't believe in any such measure as that?" "No," he said, "of course I don't, but if you let those fellows have something of that kind occasionally, it robs them of their issues, and they have not got anything to talk about until they can move on to something further." He said, "You never can satisfy them, you never can give them anything they really want. The fact is," he said, "they raise most of their issues in the hope that they will be beaten, so that they will have something more to talk about in the next campaign."

My experience of a good many years since that time has taught me that there is a great deal of truth in it, and I firmly believe that if the Radical point of view should succeed, contrary to the expressed opinion that I have given, on these various points that I have tried to discuss with you, still they would not be satisfied, and they would make their last stand upon the question of Municipal Ownership.

Now, gentlemen, obviously, after I have been talking nearly an hour, it is impossible for me to go with any thoroughness into that subject, and I am only going to detain you with a few general thoughts in reference to it. I recommend to any of you who want to have a clear opinion upon the question, who desire a concise lot of information upon that subject, to read a recent book that has been published on "The Failures of Municipal Ownership," by Ives Guyot, which I have very recently read, and which is a mine of information on the whole subject.

## Municipal Ownership a Failure

I am only going to touch upon a few of the fundamental facts in relation to it.

First, it is true that our theory of government, national and state, has thus far proved a great success, but I think it is equally true that most sober-minded men will agree that our theory of municipal government up to the present time has proved a failure. Certain it is that the calibre of men in the standard of municipal government in this country from the beginning to date, is entirely different from the standard of government, either state or national. The causes of it are many. Corruption, graft, universal suffrage, indifference of the intelligent classes to the right of suffrage, and a thousand and one things have put the wrong men in office in municipal government. Not always—I am not making a personal attack upon anyone.

I am speaking generally of the history of municipal government in this country today and in the past.

It seems to me that municipal government thus constituted has about enough to do already. Schools—the ever enormously growing school system of this country beggars description in the extent of buildings and the amount of money involved—libraries, sewers, water supply, paving, museums, parks, playgrounds for the children, health, fire and police departments. Isn't that about enough to impose upon the character of municipal governments that we have in this country? Would you think it wise to add to those burdens—telephones, telegraphs, gas, electric light and power, streets railways, subways and all the rest of it?

## The Burden of Debt

Then think of the stupendous amount of money that the municipalities would have to pay to take over these properties on any scheme of valuation, and when it comes to purchasing these properties under condemnation, the Supreme Court of the United States has put itself flatly on record in the famous Monongahela Bridge case as holding that the whole assets of the company, good will, franchise value, going value and all, must be paid for, whether they were granted without compensation or not. Think of the billions of dollars that these municipalities would have to pay! As your Chairman kindly referred to my company—somewhere between two hundred and fifty and three hundred millions for one company alone, doing business in a comparatively small state—think of the straining of municipal credit, think of the raising of the interest rate to municipalities for all purposes, their present as well as new! A sorry day for this old Republic when it starts upon any such theory of government as that.

## Some Fallacies

Now, I never heard anyone say, even an exponent of Municipal Ownership, that a municipality would operate one of these properties more economically than a private company would. Where they say the advantage comes in is between the rate of interest that the municipality can borrow at and the profit demanded by the private company. That, we will say now, with the present civic activities, is four per cent., but which, if they undertook all these new enterprises, would rise to six, and the amount of profit which the public utility man requires, as I have tried to show, is eight per cent. There they say is the advantage of a municipal ownership.

The answer to that is that two per cent. or three per cent. would quickly vanish in the sight of municipal graft and carelessness in operation—to say nothing of the inconvenience to the public that would arise from the character of the operation that the municipalities would give as distinguished from a private company. These private companies do not operate them any too well, as I well know. It is a very difficult job to operate these great public utilities, particularly the railway end of it, to the satisfaction of the public. That business is before us at every turn. It is not like the gas business, which is underground, attending to its own business all the time in a quiet way. The railway is right in front of you all the time. It is employing thousands of trained men who are like the rest of human nature, good, bad and indifferent. I would like to show you sometime in my morning's mail the complaints that are made to me about the trivial incivilities that are passed out to passengers by our trainmen. Some of them are very annoying, and I do not blame the people for being angry, and we try our best to keep up the esprit de corps and moral tone of our motormen and conductors, but human nature is alike all the world over. Sometimes they lose their temper, and sometimes, strange as it may seem, the passengers lose their temper. (Laughter.) And altogether, it is a most trying business. We have an expensive organization of trained men who are devoting their lives to the performance of that work to a maximum of efficiency. We set a standard of efficiency that no municipality could ever hope to compare with, and yet we fall short all the time. I tremble to think what would be the result of municipal operation of our street railway and electric light systems, to say nothing of the gas. This country had better go slow before it embarks upon anything of that kind.

## Uplift

Now, Ladies and Gentlemen, I believe as much as anybody else in social uplift. I want to do my part as I travel through this life, in elevating to any extent within my power, my fellow human beings, and, so I believe, do all the other prominent utility men of this country. Our company —and I speak only of our company because I have intimate knowledge of it, and I have no doubt many others are doing just as much, if not more—our company has gone nearly the limit in welfare work. We have raised the wages of our men to what they themselves realize is a maximum of all the traffic will bear. We have shortened their hours, we have adopted a comprehensive welfare system that includes old age pensions, sick disabilities, death payments, and participation in profits.

We have given our women employees a living minimum wage. In addition to that, we give all of our over 800 employees in our home office a good, square, substantial meal in the middle of the day, free of cost. We are trying, as I tried to show a moment ago, to do our part with the public. Maybe selfishly, because we believe in the long run it will bring us in more money, but whatever our motive is, we are doing it.

But I realize that there is a limit to all that. There is a limit which the Radical does not appreciate. It is right for all of us to do all we can to alleviate our brother. But let us not in doing it, adopt such highbrow methods, if I may use a modern slang word, or Socialistic methods as will make the conveyance topheavy and upset the apple cart.

## The Spirit of Man

This thought has been expressed so wonderfully well by Mr. Kipling, that in conclusion I ask you to bear with me for a minute while I read a few verses from his "Imperial Rescript."

> Now this is the tale of the Council the German Kaiser decreed,
> To ease the strong of their burden, to help the weak in their need,
> He sent word to the peoples, who struggle and pant and sweat,
> That the straw might be counted fairly and the tally of bricks be set.
>
> The Lords of Their Hands assembled; from the East and the West they drew—
> Baltimore, Lille and Essen, Brummagem, Clyde and Crewe.
> And some were black from the furnace, and some were brown from the soil,
> And some were blue from the dye-vat; but all were wearied of toil.
>
> And the young King said: "I have found it, the road to the rest ye seek:
> The strong shall wait for the weary, the hale shall halt for the weak;
> With the even tramp of an army where no man breaks from the line,
> Ye shall march to peace and plenty in the bond of brotherhood—sign!"
>
> The paper lay on the table, the strong heads bowed thereby,
> And a wail went up from the peoples: "Ay, sign—give rest, for we die!"
> A hand was stretched to the goose-quill, a fist was cramped to scrawl,
> When—the laugh of a blue-eyed maiden rang clear through the council hall.
>
> And each one heard Her laughing as each one saw Her plain—
> Saidie, Mimi, or Olga, Gretchen or Mary Jane.
> And the Spirit of Man that is in Him to the light of the vision woke;
> And the men drew back from the paper, as a Yankee delegate spoke:
>
> "There's a girl in Jersey City who works on the telephone;
> We're going to hitch our horses and dig for a house of our own,
> With gas and water connections, and steam-heat through to the top;
> And, W. Hohenzollern, I guess I shall work till I drop."
>
> And an English delegate thundered: "The weak an' the lame be blowed!
> I've a berth in the Sou'west workshops, a home in the Wandsworth Road;
> And till the 'sociation has footed my burying bill,
> I work for the kids an' the missus. Pull up? I be damned if I will!"
>
> And over the German benches the bearded whisper ran:
> "Lager, der girls und der dollars, dey makes or dey breaks a man.
> If Schmitt haf collared der dollars, he collars der girl deremit:
> But if Schmitt bust in der pizness, we collars der girl from Schmitt."
>
> They passed one resolution: "Your sub-committee believe
> You can lighten the curse of Adam when you've lightened the curse of Eve.
> But till we are built like angels, with hammer and chisel and pen,
> We will work for ourself and a woman, for ever and ever, amen."

# Centralization of Power Supply

**By Samuel Insull**

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The subject that it is my privilege to address you upon this evening is one which, under one title or another, it has been my pleasure to speak on in this city a great many times. The business in which I am engaged —which must of necessity be the basis of what I have to say to you this evening—is essentially a monopoly business, and at the outset I want it understood that I appear, not with any brief for monopoly, but to speak of the centralization of power supply as necessarily a monopoly on purely economic grounds. It would be as absurd for every householder to have his own water supply, his own gas-producing apparatus, his own methods of disposition of sewage, a transportation system for his own use, or methods of communication by wire, purely for his own use,—these things would be just as absurd as it is for the individual to have his own methods, his own apparatus, for his own individual use for the production of electrical energy.

It is economically wrong. There is absolutely no good reason for it. The economics of the situation demand that the supply of energy—whether it be for use in private residences, for use in the store, for use by the manufacturer, for use by the transportation company—if the most economical results are to be obtained, if capital is to be conserved, if labor is to be conserved, if the prime source of power, whether it be the coal in the ground, or the water-fall tumbling down the mountainside is to be conserved; if we are to get, in short, the very best possible results alike for the user of the energy in low prices, for the producer in giving him a fair return on his capital, it is essential that the business of supplying that energy shall be centralized in one vast organization for a given area.

So convinced am I of this fact,—and I hope that my examples which will be shown to you this evening will convince you of the fact—that it would seem to me that in these days of regulation, in these days of preaching of economic operation of our various public services, the day will ultimately come when some of these great regulating bodies, which are so absolutely necessary in a business which must naturally be a monopoly, will question the waste of capital, the waste of fuel, and the waste of effort that goes on where the production of energy, instead of being centralized, is carried out on a basis of separate supply to separate classes of business and separate classes of users.

One great trouble in dealing with this subject is that it is usually viewed by those who discuss it from the point of their own particular interests; I might almost say from the point of view of their prejudice. They do not take a broad view of the subject as to what is best for the whole community, but they discuss it from the point of view of pride and satisfaction in the manufacture of energy in the particular power station in which they are particularly interested. Those of us who do not agree with them must overcome that prejudice, the prejudice of the engineer, the prejudice of great captains of industry, who, however well posted on the particular line of business to which they have devoted their lives, know little or nothing about the economics governing the production and distribution of electric energy.

There is another class of men who discuss the subject. I remember particularly a discussion of it within the last few months by a distinguished European engineer before one of the learned societies of Europe. He took it up with little or no knowledge of our conditions, unacquainted with the character of the service we supply, or the cost of that service, because of the various things demanded of us here that are not demanded in Europe, and with little or no knowledge of the elements entering into our capitalization accounts, and, of course, he came to the conclusion that the only method of handling the class of business about which we are to talk this evening is the method carried on in greater European cities, in which the corporations with which he is connected are mostly interested.

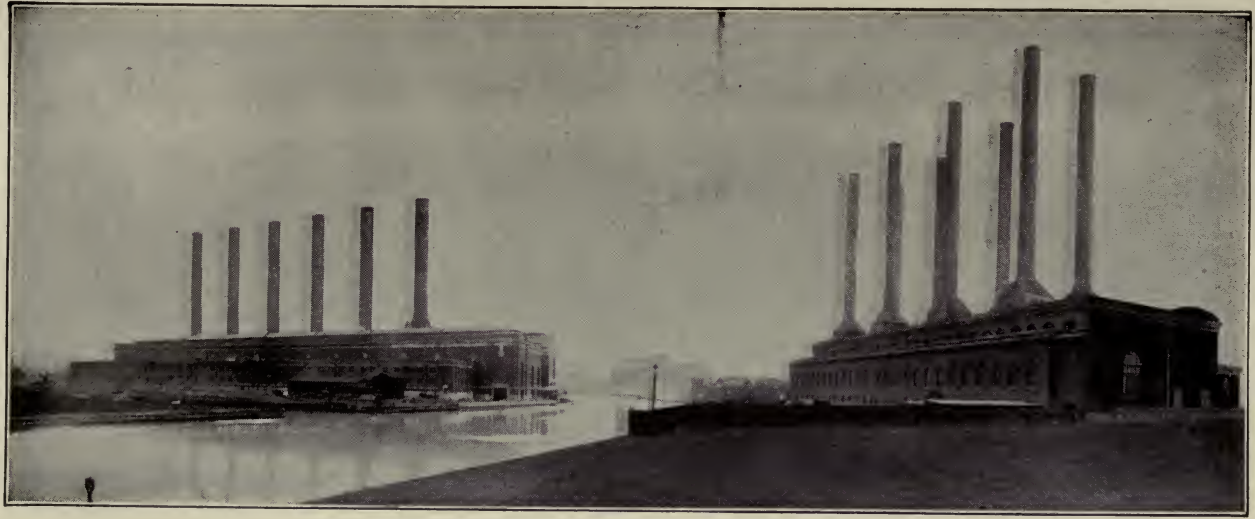
Whilst I am naturally obliged to use to a greater or less extent the figures compiled by the statisticians of the company with which I am very intimately associated in Chicago, I hope to draw lessons from these figures that will show you that, on broad economic grounds, as a matter of the best interests of the community, whether that community be in a large city or in a small country town or village, or even in a rural district, it is for the best interests of the whole community that this class of business should be run as a monopoly. As I stated in the first case, it necessarily should be a regulated monopoly, as no public service, privately-owned, and run as a monopoly, should be unregulated; and that it should be run on the basis of one system of distribution, one central authority for production; and if this course is followed all through the best results will be obtained for all, the greatest possible conservation of our natural products will be achieved with a much reduced price for the product charged to the consumer, and the greatest possible profit, within reasonable limits, be the reward of those who have the courage to put their money into the enterprise.

Fig. 1 presents two modern power stations operating practically as one. This is a sight which you will see in most of the large cities on both sides of the Atlantic. The capacity of the two stations shown in the illustration will eventually be from four hundred thousand to four hundred and fifty thousand horse power. They operated this past winter between three hundred twenty-five thousand and three hundred seventy-five thousand horse power.

Fig. 2 is a picture of the interior of the turbine room of one of the stations shown in Fig. 1. The capacity of each one of these units is about 18,000 horse power. To give you some idea of the magnitude on which this business is run at this time, the first four units shown in the illustration have a combined capacity about equal to the engine power of the Lusitania or Mauritania, the two big Cunard steamships. This is all that I will give you in the way of pictures, but those will convey some idea of the size and stability of the buildings and plant used in this class of business.

Fig. 3 shows the diversity of demand. The fundamental basis of profit-making in public service business is the diversity of demands. That is the difference between one human being and another, the desire of one human being to do one thing, and the desire of another human being to do something else, at the same time. I have used this particular chart a number of times, and so have a number of my assistants, to demonstrate

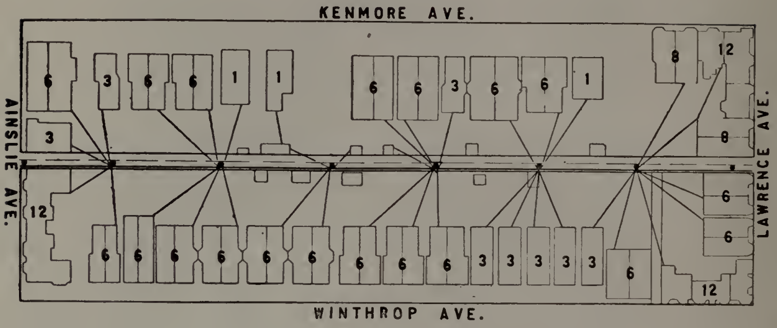
Fig. 1



PANORAMIC VIEW OF THE FISK AND QUARRY STREET STATIONS OF THE COMMONWEALTH EDISON COMPANY

Fig. 3

BLOCK OF APARTMENT BUILDINGS



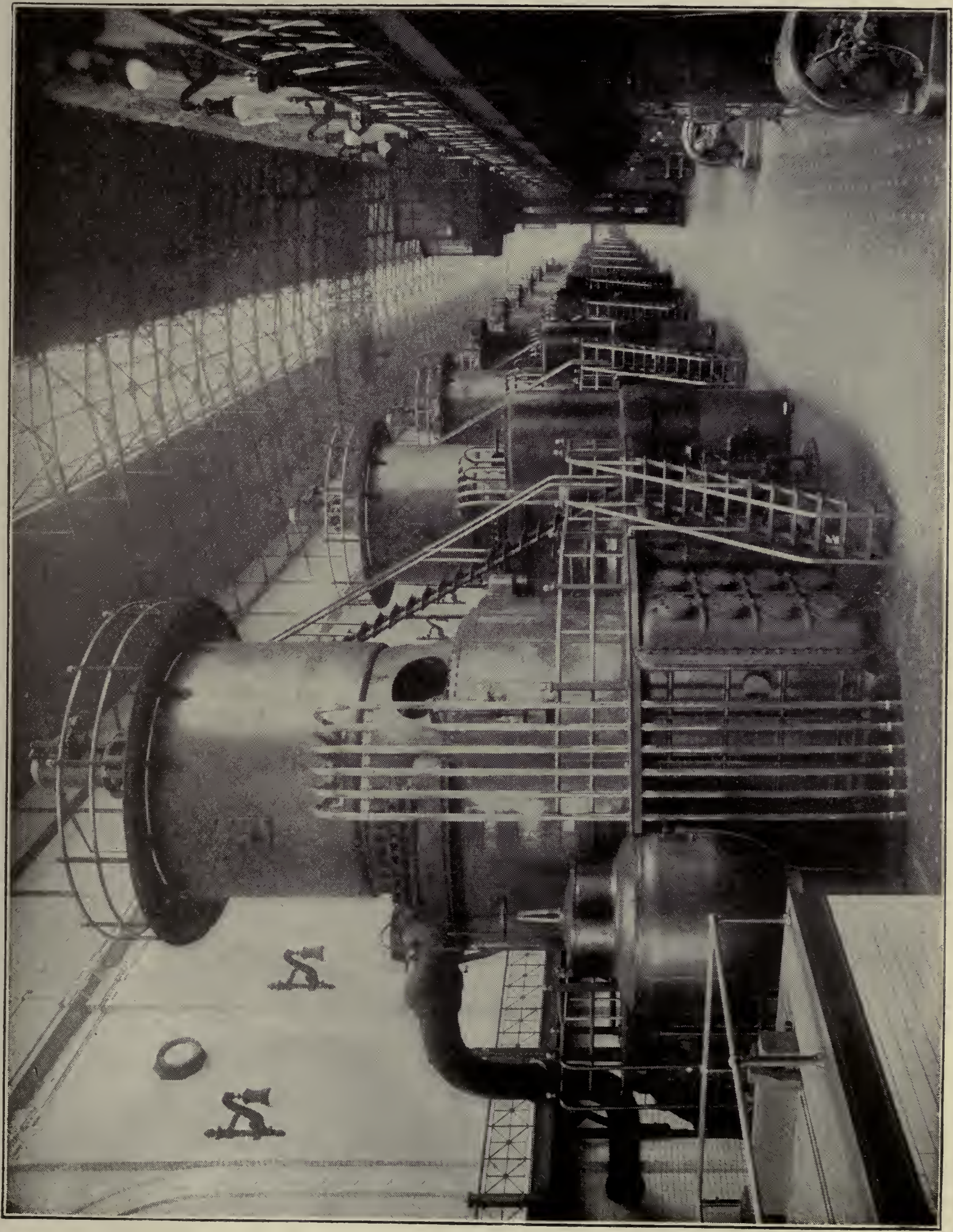
| | |
|---|---|
| Number of apartment customers | 193 |
| Number of hall lighting and garage customers | 34 |
| Average number of lamps per customer | 12 |
| K. W. H. used per year | 49,620 |
| Customers separate maxima | 92 K. W. = 6.3% load factor |
| Maximum at transformers | 29 K. W. = 20% load factor |
| Annual income per customer | $18.34 |
| Diversity factor | 3.2 |

this phase of the subject. The diagram represents a block of relatively small apartments in the northern part of Chicago, 193 apartments in all, and there are 227 meters in the block, being used by 193 apartment customers and 34 hall lighting and garage customers. If you take each customer by himself, that is, each apartment by itself, the use of energy in each separate apartment is so slight that the investment to take care of that particular customer, if you trace it back to the generating station where the power is produced, would not be used on an average more than between six and seven per cent. of the time. But so varied are the ideas of human beings and they so seldom do the same thing at exactly the same moment that, if you take the whole 193 apartments together, and then find out how much energy as a whole they use at one particular moment, the fact is developed that the diversity of their demand is so great that instead of using your investment only between six and seven per cent. of the time, they use your investment, when taken as a whole, twenty per cent. of the time.

If you will follow around that neighborhood a little further, you will find a number of local stores, nickel shows, and all the various types of stores that go to make up a local community, and when you add that business to the business of the apartments in the block, you find that you have increased the average demand on your investment in that particular neighborhood to such an extent that your investment is used thirty per cent. of the time.

When you trace this load to the power station, you find that such is the combination of demand from one class of business and another that

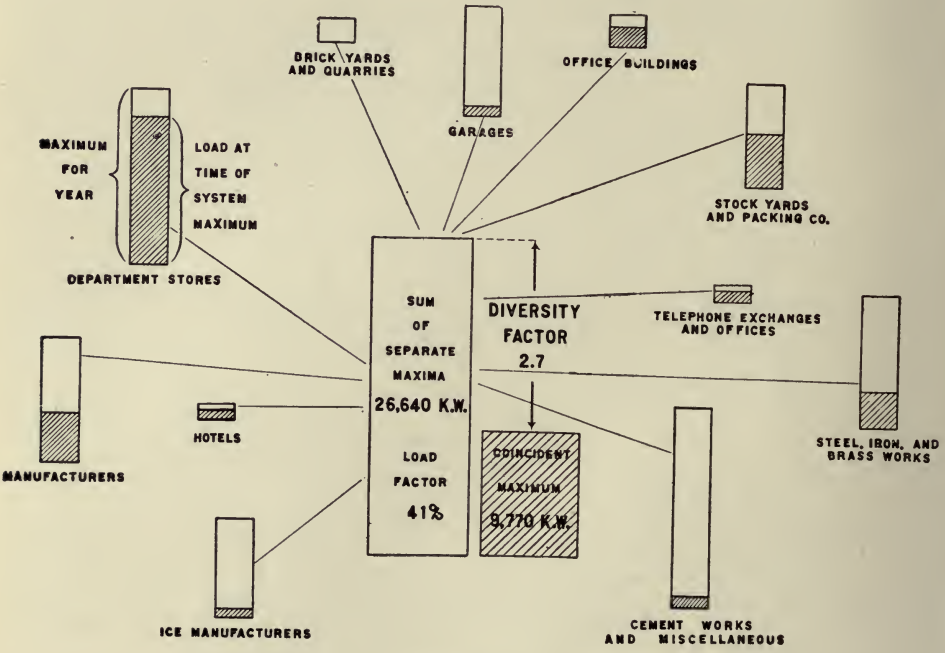
Fig. 2



TURBINE ROOM, FISK STREET STATION COMMONWEALTH EDISON COMPANY these people in the suburban territory call on you for the greatest amount of energy, not when you require that energy to operate the office buildings and the elevators in these buildings, and the transportation system, and the stores and the workshops, but about two hours after all that work is practically closed down.

The whole question of the economics of the business of electric energy supply are really summed up in the few remarks I have made on that particular chart, and the information which is given on the chart. The question of profit and loss, of the possibility of selling at one price or another, is all involved in that. It is a question of the diversity of the demand affecting the average use of your investment.

Fig. 4


BRICK YARDS AND QUARRIES
GARAGES
OFFICE BUILDINGS
MAXIMUM FOR YEAR
LOAD AT TIME OF SYSTEM MAXIMUM
DEPARTMENT STORES
STOCK YARDS AND PACKING CO.
SUM OF SEPARATE MAXIMA 26,640 K.W.
LOAD FACTOR 41%
DIVERSITY FACTOR 2.7
TELEPHONE EXCHANGES AND OFFICES
COINCIDENT MAXIMUM 9,770 K.W.
STEEL, IRON, AND BRASS WORKS
MANUFACTURERS
HOTELS
ICE MANUFACTURERS
CEMENT WORKS AND MISCELLANEOUS

DIVERSITY

OF LARGE LIGHT AND POWER CUSTOMERS

Fig. 4 gives similar information regarding an entirely different class of business which shows precisely the same thing. It has been only in the last year or so that it was possible to register the exact time at which a given consumption of energy takes place. We have tried in this particular chart to give you information as to the diversity of very large light and power customers as distinguished from very small light customers as shown in the previous chart.

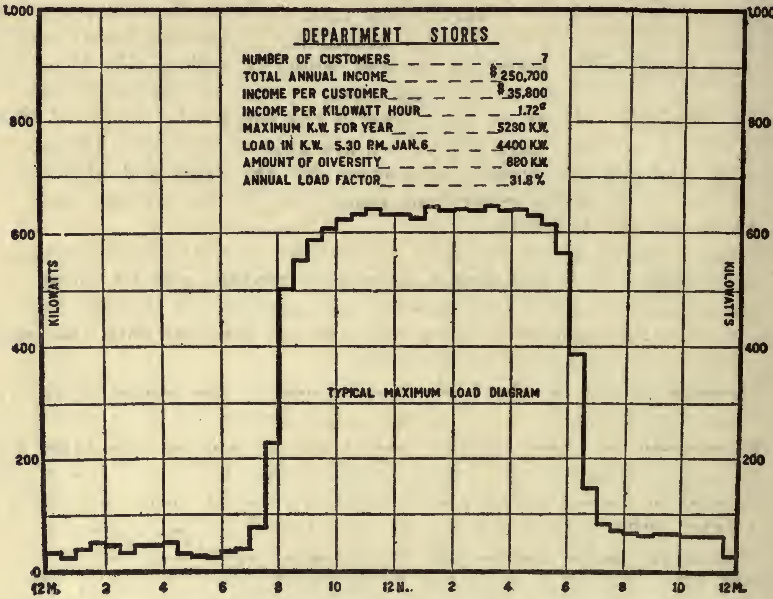
The Chicago company of which I have the privilege of being the head was the pioneer in installing in the early days a demand recording meter called the Wright Demand Meter, and to work out, from a very large number of these customers, a tabulation on the relation of the maximum to the connected load for customers of various sizes and various classes. Those actual statistics have been used by very many companies and organizations throughout this country in their rate making schemes, which are based largely on the percentage of the connected load. The information on this particular chart is the result of exactly the same policy applied to our large or wholesale customers. We have been installing, as fast as practicable, metering devices which furnish us the tape record of the half-hour readings of the watt meter of each of our large customers, and the tabulation shown on this chart is the result of a study of 82 such customers. From this tape record we are able to plot the 24-hour load diagrams, and get the highest maximum for the year and also the load at the time of the total coincident maximum for the entire system and thus arrive at the diversity.

I believe this is about the first information of this character that has been published. It is the first I have seen myself, and to those of you who are familiar with the business the mere showing of the chart explains itself, but for the benefit of those who are not familiar with the subject I will give some detailed explanation.

Referring to Fig. 4, the highest rectangle in the center of the chart represents the total amount of energy called for by the 82 customers that are represented in these smaller blocks shown around the large block. The maximum load on our system came on the 6th day of January, and the demand on us for energy, as I will show partly from this chart and partly from subsequent charts, was so diversified that notwithstanding it would have taken 26,640 kw. or, roughly speaking, between thirty thousand and thirty-five thousand horse power, to take care of the maximum demand of each one of these customers separately, on the day when the greatest demand came on us from all sources, it took only 9,770 kw. for these same customers. The difference between 26,640 kw. and 9,770 kw. represents what I have tried to explain to you as the diversity factor in our business.

That variation of demand or diversity comes about from a great variety of reasons. For example, the brick yards and quarries, represented by the block in the upper part of the diagram, do not run in the winter time as the frost interferes with their business. The department stores represented by the block in the upper left hand corner are particularly busy just before and just after Christmas, so that their demand is very high at that time. Referring to the block representing manufacturers, the workman cannot run a tool in a workshop—assuming the workshop is meant for light manufacturing purposes and located in a high building—he is unable to run a tool in the shop, go down in the elevator which takes him to the street, travel on a street car, and use electric light in his home all at the same time. The maximum demand on the 6th of January came from all of these various sources, and you see that the manufacturer naturally shuts down before someone else is using the energy. Ice manufacturers do a relatively small business in zero weather. Therefore their demand is very slight in the middle of winter. In the case of such heavy users of energy as cement works we make a special arrangement which provides that they shall shut off their demand at the period of our maximum load. In the case of steel, iron and brass works, their demand occurs before the period of maximum load on a dark winter day, and so on with the other classes of business shown in the chart. The result is that the diversity is so great that what cannot be produced economically separately can be produced very economically as a whole.

Fig. 5



I am going to show you now in detail the various charts which represent the various businesses shown on the previous slide. Fig. 5 represents the main department stores of Chicago. There are seven customers, seven department stores, the total annual income from which is $250,700, the average income per customer being $35,800 per year. The income per kilowatt hour, on account of the very extraordinary character of the load and the large amount of energy they buy, is 1.72 cents. The maximum kilowatts for the year amounts to 5280. The load at the time of the maximum load on our system, January 6th, was 4400 kilowatts, and the amount of diversity was 880 kilowatts. The annual load factor, that is, the average use of our investment for the separate customers, is 31.8 per cent. There are 130.8 acres of floor area in these department stores, and it costs about 4.4 cents per square foot per year for light and power.

Fig. 6 represents some 17 public garages, that being the number on which we have the information. You will notice the income per kilowatt hour is 2.23 cents. The maximum load in kilowatts for the year is 2,220, and at the time of our maximum load, on January 6th, it was only 90 kilowatts. These contracts are taken on the basis of our limited hour or off-peak power rate, containing a provision that they shall shut off their service at the time of our maximum load. The amount of diversity involved in this service is very large, being 2,130 kilowatts, and the annual load factor is very low, being 20.4 per cent., but the business is very desirable because the demand for it comes at other than the times when our investment is needed to the greatest extent by the greater number of our customers.

It is of interest to note that in the 17 garages mentioned there are 854 electric vehicles charged, at a cost per vehicle of $109 per year, or say somewhere about 30 cents a day for feeding the horses, so to speak.

Fig. 6

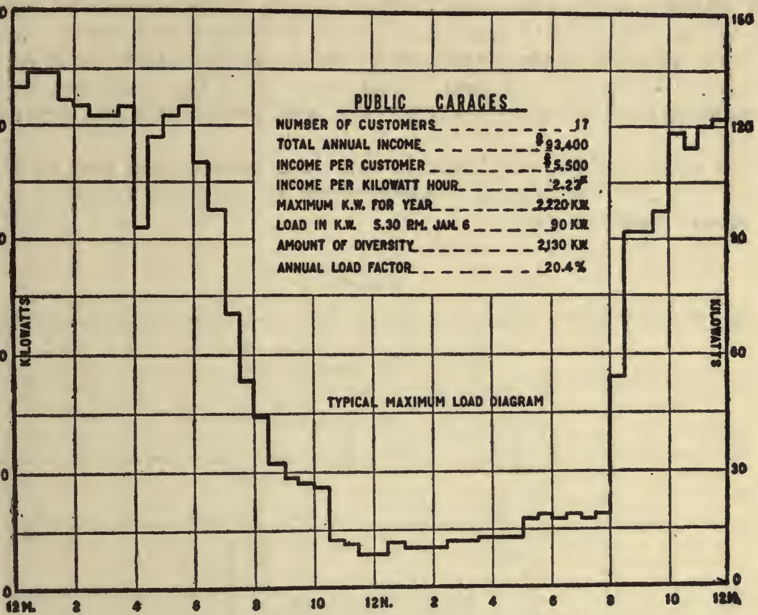


Fig. 7

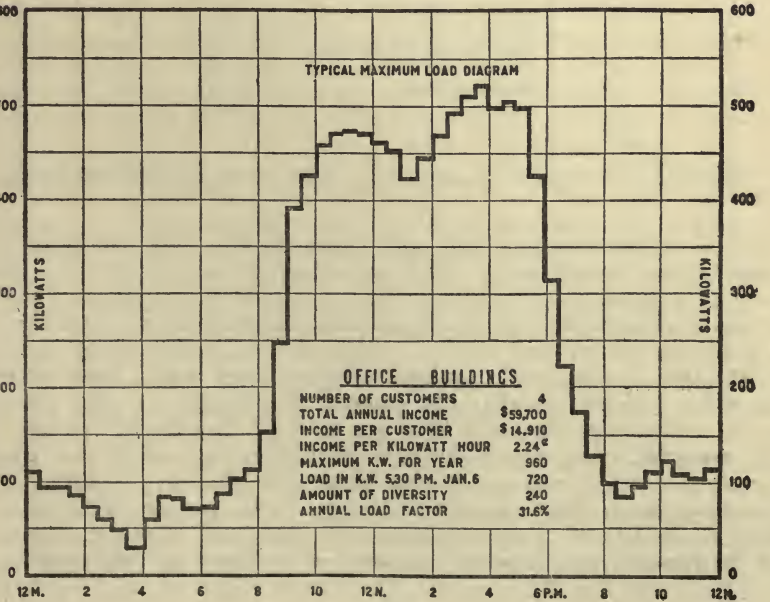


Fig. 7 represents the ordinary office building curve and is not unlike a department store curve. The especially interesting facts regarding office buildings are the load diagram, load factor and the diversity factor. Office buildings have always been considered the least desirable class of business which it was possible for the central station company to obtain. This diagram and a great many others which we have studied show that at least a considerable portion of office buildings business is about as desirable as most other classes of business, as the yearly load factor is very good, being 31.6 per cent. The reason for this, of course, is the all day lighting on the lower floors and halls, and the elevator and other power service.

The office buildings included in this data have a floor area of 717,000 square feet and the cost of electricity for all purposes amounts to 5.2c. per square foot per year.

Fig. 8

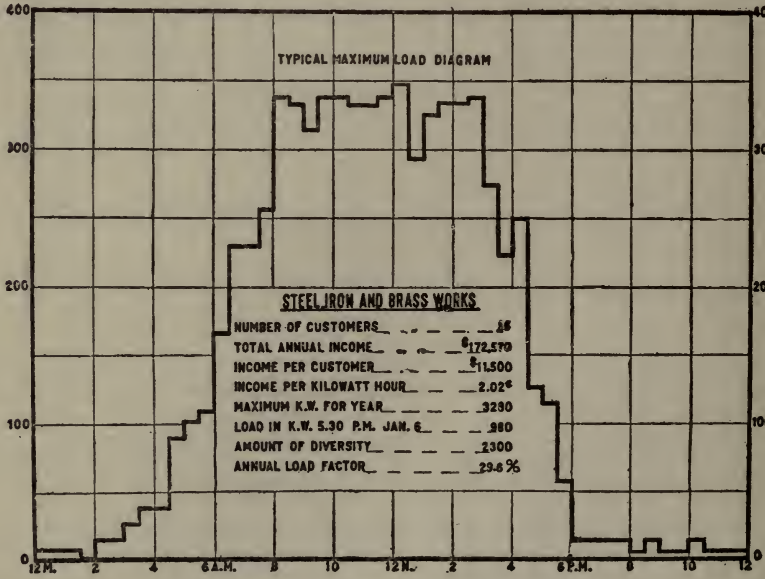


Fig. 8 represents steel, iron and brass works. If I had been asked, before we had the necessary instruments to indicate not only the amount of energy consumed but also the time at which it is consumed, whether that class of business was very desirable, because of its diversity, notwithstanding its low load factor, I think my inclination would have been to state that I very much doubted whether there was a large diversity. You will see, however, that the amount of diversity is 2300 kilowatts, and the annual load factor is 29.6 per cent. I had the impression that such manufacturing establishments probably demanded the greatest amount of energy from us at the same time that everybody else was demanding the greatest amount of energy. The contrary is the case. It simply shows to me—I do not know how it appears to the engineers who may be present—the extreme necessity of knowing all you possibly can about your own line of business. The diversity in that case is very great, it has a relation of 3280 kilowatts to 980 kilowatts, and notwithstanding the low load factor, the value of it from every point of view is very great.

Fig. 9 gives a number of different classes of manufactures. They are very much on the same general order as the steel, iron and brass works, and show a very decided diversity.

Fig. 9

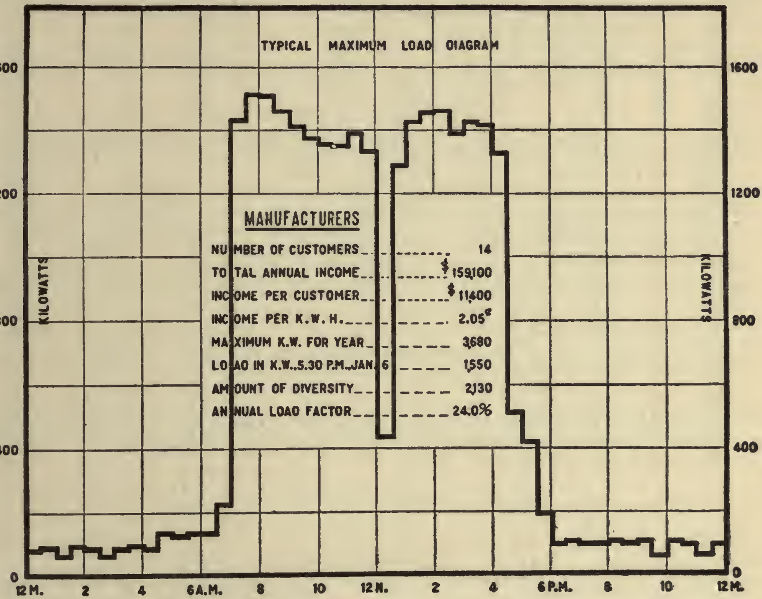


Fig. 10 relating to the stock yards and packing industries in Chicago, gives an entirely different class of business, but shows an extremely good diversity and an extremely good load factor.

Fig. 11 shows the electric current supplied to the five telephone exchanges and offices. The cost of electricity per telephone customer or telephone connected, amounts to about 28 cents per annum.

Fig. 12 represents the load diagram of ice manufacturers. The demand there is very satisfactory, indeed, except that it is extremely low in the winter time. It practically goes off in the winter time. The load factor is very high, that is, the average annual load factor is 56.2 per cent, and at the time when the maximum demand is made on us for energy, that is, the time when our plant is taxed to the utmost, the amount of energy used in ice manufacturing is only one per cent. of the maximum demand for the year in this class of business.

Fig. 13 gives the same class of information with relation to hotels. The load factor is very good, but the diversity is relatively poor as compared with some of the other businesses.

Fig. 14 shows the consumption by brick yards and quarries which, as I stated before, do not run in the winter time.

Fig. 15 represents another class of business, cement works, and miscellaneous operations which use a very large amount of energy, and with the greatest possible diversity between the maximum demand of the load of this class of business and the demand at the period of our maximum load of our entire business.

Fig. 10

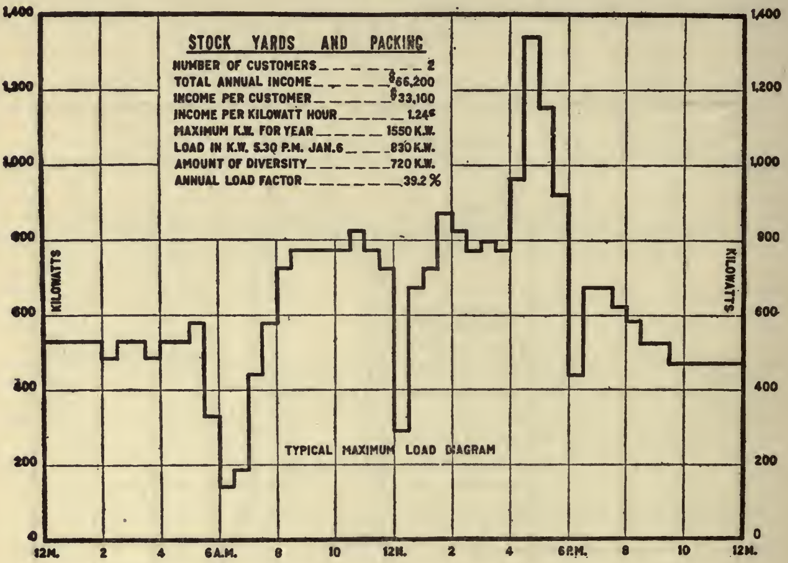


Fig. 11

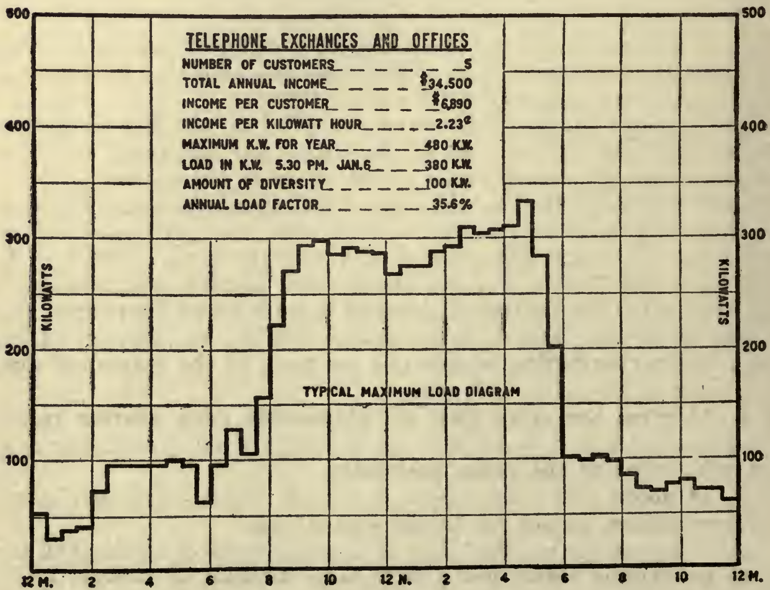
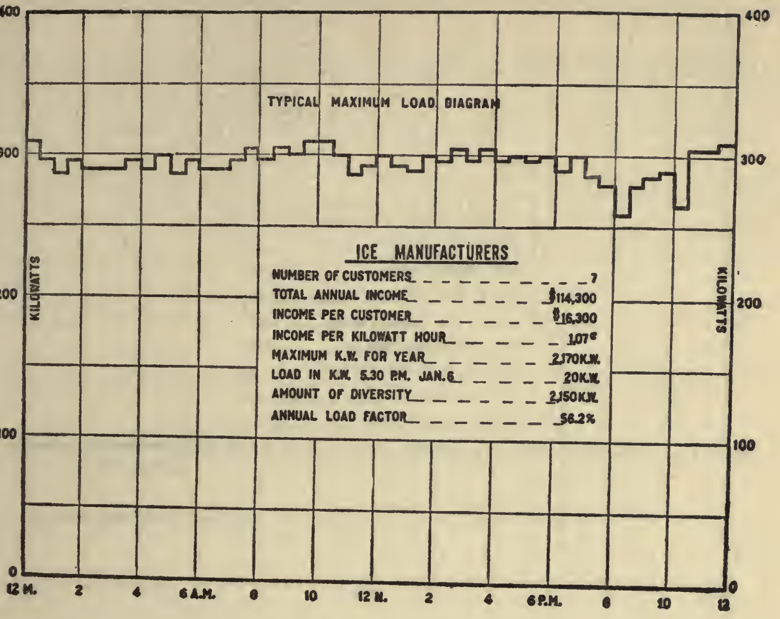


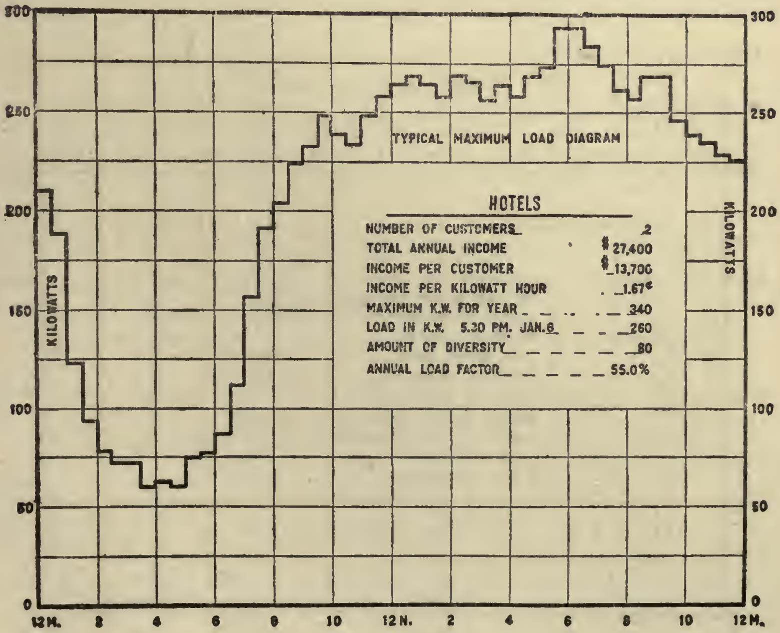
Fig. 12



**ICE MANUFACTURERS**

| | |
|---|---|
| NUMBER OF CUSTOMERS | 7 |
| TOTAL ANNUAL INCOME | $114,300 |
| INCOME PER CUSTOMER | $16,300 |
| INCOME PER KILOWATT HOUR | 1.07¢ |
| MAXIMUM K.W. FOR YEAR | 2,170 K.W. |
| LOAD IN K.W. 5.30 P.M. JAN. 6 | 20 K.W. |
| AMOUNT OF DIVERSITY | 2,150 K.W. |
| ANNUAL LOAD FACTOR | 56.2% |

Fig. 13



**HOTELS**

| | |
|---|---|
| NUMBER OF CUSTOMERS | 2 |
| TOTAL ANNUAL INCOME | $27,400 |
| INCOME PER CUSTOMER | $13,700 |
| INCOME PER KILOWATT HOUR | 1.67¢ |
| MAXIMUM K.W. FOR YEAR | 340 |
| LOAD IN K.W. 5.30 PM. JAN. 6 | 260 |
| AMOUNT OF DIVERSITY | 80 |
| ANNUAL LOAD FACTOR | 55.0% |

Fig. 14

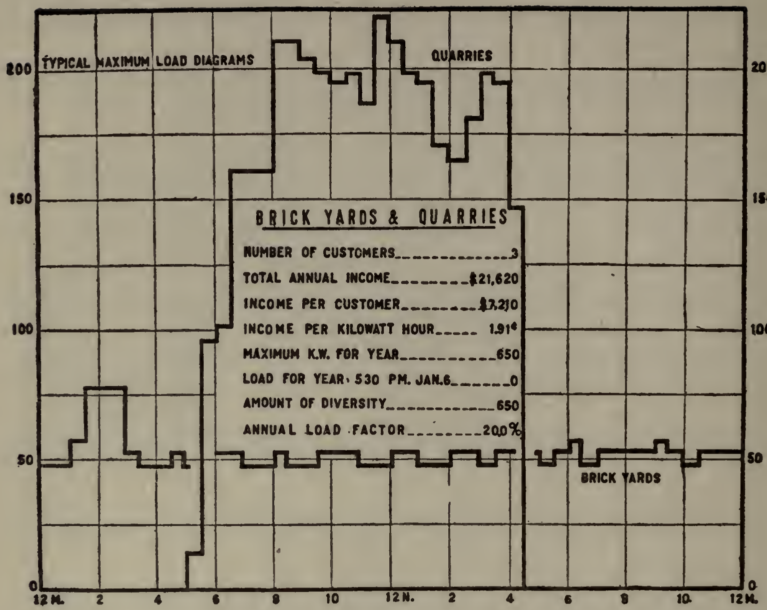

TYPICAL MAXIMUM LOAD DIAGRAMS
QUARRIES
BRICK YARDS & QUARRIES
NUMBER OF CUSTOMERS______________3
TOTAL ANNUAL INCOME________$21,620
INCOME PER CUSTOMER________$7,210
INCOME PER KILOWATT HOUR_____ 1.91¢
MAXIMUM K.W. FOR YEAR__________650
LOAD FOR YEAR, 530 PM. JAN.6______0
AMOUNT OF DIVERSITY____________650
ANNUAL LOAD FACTOR_________20.0%
BRICK YARDS
200
150
100
50
0
12 M.
2
4
6
8
10
12 N.
2
4
6
8
10
12 M.

Fig. 15

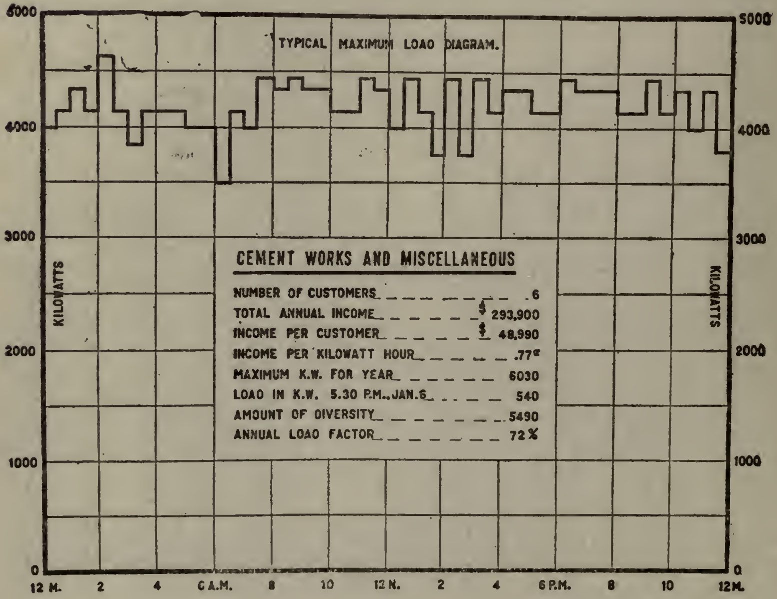

TYPICAL MAXIMUM LOAD DIAGRAM.
CEMENT WORKS AND MISCELLANEOUS
NUMBER OF CUSTOMERS_ _ _ _ _ _ _ _ 6
TOTAL ANNUAL INCOME_ _ _ _ _ _ $ 293,900
INCOME PER CUSTOMER_ _ _ _ _ $ 48,990
INCOME PER KILOWATT HOUR_ _ _ _ _ .77¢
MAXIMUM K.W. FOR YEAR_ _ _ _ _ _ 6030
LOAD IN K.W. 5.30 P.M..JAN.6_ _ _ _ _ 540
AMOUNT OF DIVERSITY_ _ _ _ _ _ _ 5490
ANNUAL LOAD FACTOR_ _ _ _ _ _ _ 72%
KILOWATTS
5000
4000
3000
2000
1000
0
12 M.
2
4
6 A.M.
8
10
12 N.
2
4
6 P.M.
8
10
12 M.

Table 1 shows the sum of all those that went before. It is a very good indication of the average power business in any large city. As I have stated, there are only 82 customers included in this and the previous charts on that subject.

We have about 428 other large customers, who give us a million and a half dollars of income per year, so that the power business of that character yields us somewhere between two and one-half and three millions of dollars.

We are applying the same method of measuring as rapidly as possible to all our large power customers, and hope eventually to have elaborate tabulations which will show us the advantage of one class of business as against another and the relation of the prices charged to earning capacity, from our point of view, of each separate kind of business.

Table 1

## SUMMARY OF LARGE LIGHT AND POWER CUSTOMERS WITH PRINTING TAPE WATTMETERS

| No. of Customers | KIND OF BUSINESS | Annual Income | | Maximum K. W. | | | Load Factor |
|---|---|---|---|---|---|---|---|
| | | Amount | Per K.W.H. | For Year | 5:00 P.M. Jan. 6 | Diversity | |
| 7 | Department Stores.... | $250,700 | 1.72c | 5,280 | 4,400 | 880 | 31.8% |
| 17 | Garages............. | 93,400 | 2.23c | 2,220 | 90 | 2,130 | 20.4% |
| 4 | Office Buildings....... | 59,700 | 2.24c | 960 | 720 | 240 | 31.6% |
| 15 | Steel, Iron and Brass Works............ | 172,600 | 2.02c | 3,280 | 980 | 2,300 | 29.6% |
| 14 | Manufacturers....... | 159,000 | 2.05c | 3,680 | 1,550 | 2,130 | 24.0% |
| 2 | Stock Yards and Packing................ | 66,200 | 1.24c | 1,550 | 830 | 720 | 39.2% |
| 5 | Telephone Exchange and Offices......... | 34,500 | 2.23c | 480 | 380 | 100 | 35.6% |
| 7 | Ice Manufacturers.... | 114,300 | 1.07c | 2,170 | 20 | 2,150 | 56.2% |
| 2 | Hotels.............. | 27,400 | 1.67c | 340 | 260 | 80 | 55.0% |
| 3 | Brick Yards and Quarries................ | 21,600 | 1.91c | 650 | .... | 650 | 20.0% |
| 6 | Cement Works and Miscellaneous...... | 293,900 | 0.77c | 6,030 | 540 | 5,490 | 72.0% |
| 82 | | $1,293,300 | 1.35c | 26,640 | 9,770 | 16,870 | 41.2% |

| | |
|---|---|
| Diversity Factor.......................................... | 2.7 |
| Total K. W. H. sold.................................. | 96,077,500 |

Table 2

## ANNUAL INCOME FROM SALE OF ELECTRICITY

| | Per Capita | Per K. W. H. |
|---|---|---|
| Baltimore.............................. | $4.22 | 2.72c |
| Philadelphia........................... | 4.65 | 3.67c |
| New York and Brooklyn.................. | 6.37 | 4.45c |
| San Francisco and Vicinity............. | 6.40 | 1.97c |
| Boston (City and Suburbs).............. | 6.48 | 5.37c |
| Chicago................................ | 7.18 | 2.05c |

Table 2 shows two other interesting features in connection with the production and distribution of large amounts of energy, and those are the sales per capita and the price per kilowatt hour. There is some question as to the extent to which per capita figures are any real guide to conditions, but the fact is that it is almost the invariable rule that where you have a low price per kilowatt hour you have a very high income per capita; Boston with its high income per capita being an exception, as is also Baltimore with a low income per capita owing to its large colored population. I happen to have the figures as regards gas consumption (Table 3) and it is rather interesting to find that, although the electrical business is a comparatively new one, we have in Chicago already managed to pass the sales per capita of our friends in the gas business. The income from the sales of gas per capita is $7.13, and the income from the sales of electricity per capita is $7.18.

Table 3

ANNUAL INCOME FROM SALE OF GAS

| (Exclusive of Street Lighting) | Per Capita. |
|---|---|
| Baltimore | $6.17 |
| Philadelphia | 6.21 |
| Brooklyn | 6.31 |
| Chicago | 7.13 |

Fig. 16 shows that as the output per capita increases, the load factor improves and the income (and cost) per kilowatt hour decrease. For instance, the income per kilowatt is very high in London, England, the output per capita is very low, and the load factor is relatively poor.

If I had on this chart a cross curve which would follow practically the line of income per kilowatt hour, that is, figuring cost as total labor and material cost, interest, and depreciation, you would see that the rule is almost invariable that as the income per kilowatt hour goes down, as the output per capita goes up, the cost per kilowatt hour follows the line of income and the load factor necessarily shows a very decided improvement.

It is interesting to note in this chart that the highest output per capita is at Niagara Falls, and the lowest income per kilowatt hour is also at Niagara Falls. San Francisco, Minneapolis, and Baltimore are all in the area of hydro-electric production, which is supposed to be very much cheaper than production from coal. Chicago, with steam production, is pretty close to the hydro-electric production, both as to lowness in income, high point of output per capita, and first-class load factor, being between 40 and 50 per cent. Last year it was 43 per cent.

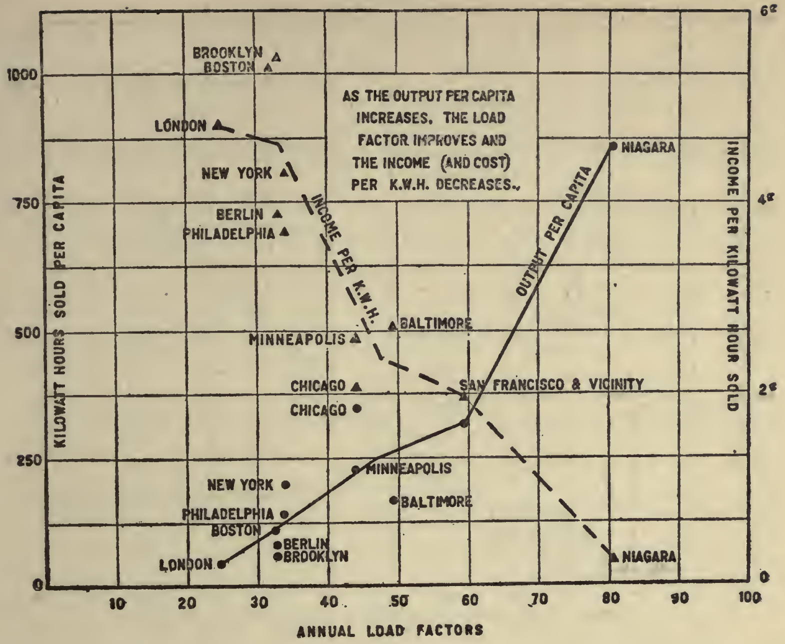
For some time we questioned the reliability of these figures and of the law that we thought was shown by them, and so we looked up the census figures of the United States Government.

The census figures are given for whole states only, and, plotted, they show as in Figure 17.

As there was not room to print the names of all the states on the diagram, a tabulation of all the states is given in Addenda A.

As the maximum demand of the various plants is not given in the census figures, we had to base the load factors on the plant capacity instead of the maximum demand, but you will find that, relatively, the

Fig. 16



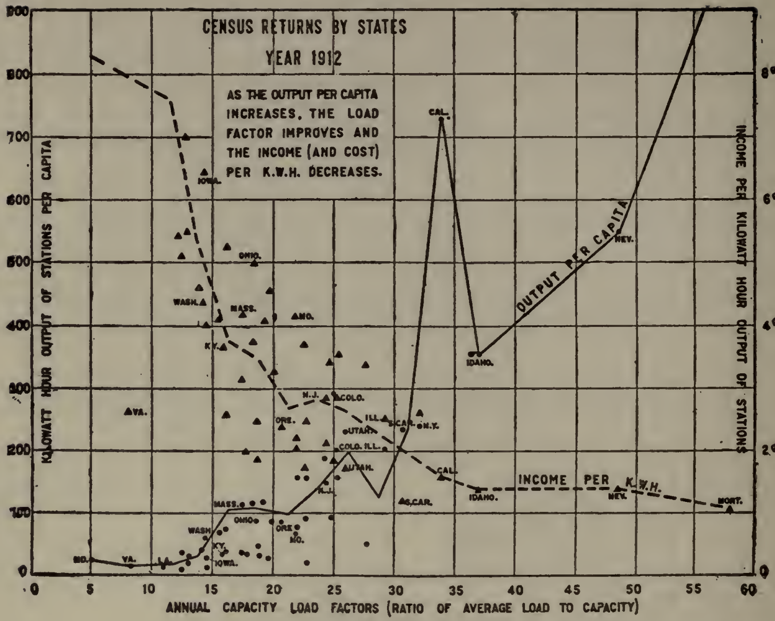
same rule follows as was shown in the case of the cities. The income per kilowatt hour goes down pretty steadily, the output per capita goes up pretty steadily, the load factor improves as selling price is lowered, and the output per capita goes up as the selling price is lowered.

I think that that particular chart and the preceding table are among the most interesting which we can produce on this subject of the centralization of power supply. They show that all the great water power states of the West are in the category of low income per kilowatt hour, high output per capita, and extremely high load factor, and it is extremely interesting to me to note that, in a coal state like Illinois, where we have little or no water power in proportion to the energy consumed, we are located on this chart right among the water power states. New York is naturally in that group, because it is brought there by the extraordinary conditions at Niagara Falls.

I think that curve is an absolute demonstration of the necessity of monopoly in the production and distribution of energy. Those of you who are familiar with the business will recall the situation in the great water power states—you will remember that in order to utilize the water powers that have so far been brought into use it has been necessary in most cases to make installations running up into very high horse powers and requiring very large sums of money to install the plants. The territory is sparsely settled, the industries are relatively few, and the engineers engaged in marketing the product of those expensive water power plants have to take every class of business within their reach.

No one within the area of a water power on the Pacific slopes of the Sierra Nevadas, or upon the Mississippi slopes of the Rocky Mountains would think of producing their own power if a transmission line of a water

Fig. 17



power company was anywhere within reach, partly owing to the very high price of fuel in some of the territory, and partly owing to the very low price quoted for energy by the majority of the large hydro-electric producing companies; and the fact is that, whether it is to run the copper mines of Montana, or to run the trains to cross the mountains further west towards the Pacific Coast, instead of having their own individual plants to do the work they go in most cases to the hydro-electric power producing companies.

That condition has gone on throughout the western water-power states for a number of years, simply as a matter of necessity. The hydro-electric companies needed the income, and they quoted tariffs that would get the business. As a result in most of the territories where hydro-electric plants are operated, such a thing as a steam plant is unknown, except under almost extraordinary circumstances, or on the transcontinental lines; and even on the mountain grades of these lines it will only be a few years before steam power will be unknown to the transportation companies.

It is to produce the same character of concentration of production and distribution of energy in the more densely settled portions of the United States, in that portion of the states this side of the Mississippi River, where coal is relatively cheap and yet where it is being used up at such a rate as to seriously jeopardize the natural resources of the country, that I am mainly interested in talking about to you to-night. All that I am trying to show you is that the character of business done in California, and Idaho, and Nevada, and Montana, and Colorado, and the other water power states, should be done in the Eastern States in precisely the same way, where coal is the basis of energy, as it is done where water is the basis of energy.

Fig. 18

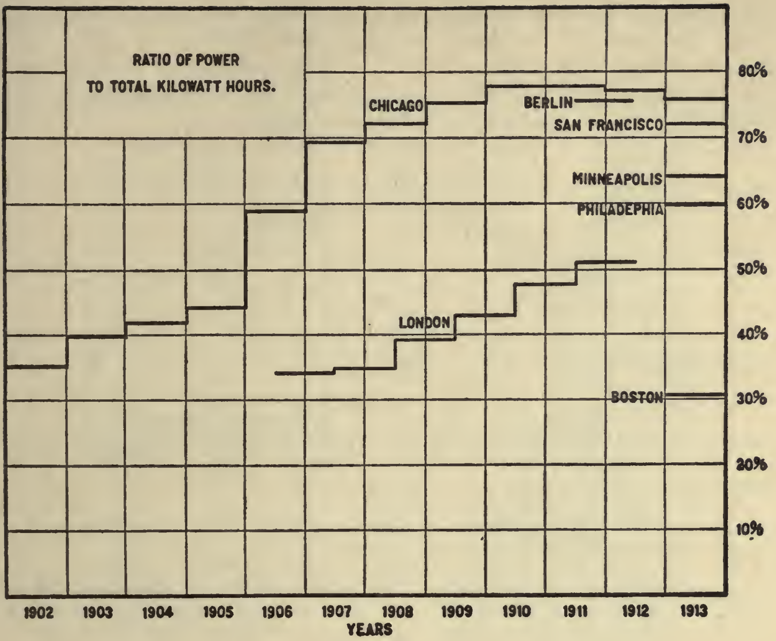


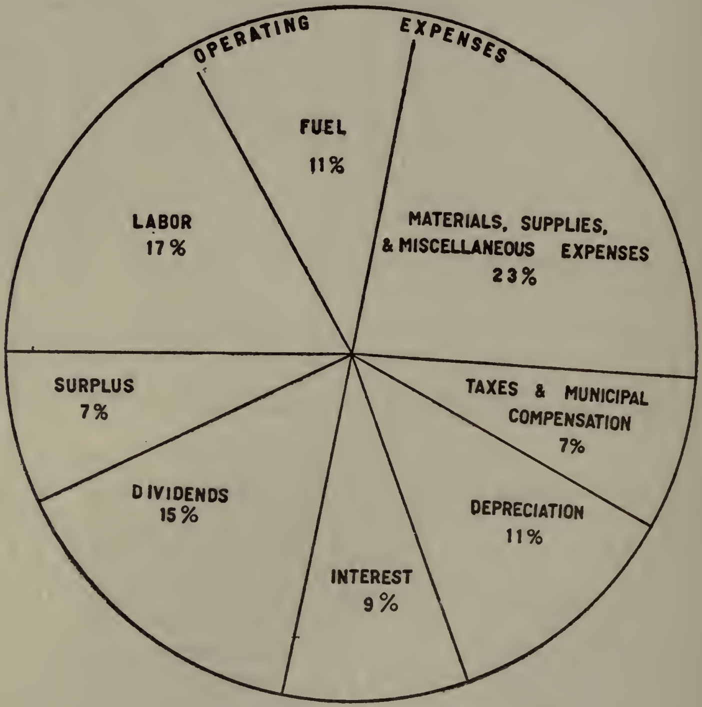
Fig. 18 is interesting simply as showing how relatively unimportant is the lighting in connection with most of the large power companies in this country and in Europe. This shows the ratio has gone up in a period of years. The first one, Chicago, shows 75 per cent.—that is the ratio of power to the total kilowatt hours, and that would mean that lighting represents practically the other 25 per cent. Berlin comes next, San Francisco next, Philadelphia next, London next, and so on down to Boston.

Fig. 19 is interesting in showing what becomes of the money received by power companies, which has some bearing on the cost of our product, our selling price. This chart represents the operations of a company which has an income of about $17,000,000 a year. You will notice that one-half of the cost is labor, fuel, materials, supplies, and miscellaneous expenses. Taxes and municipal compensation amount to 7 per cent. To the layman, the fact that the fuel is only 11 per cent. while the right to do business costs 7 per cent. would seem to be somewhat unusual.

You will notice that one-half of all the expense represents the cost of money and the right to do business, that is, depreciation, 11 per cent.—11 cents out of every dollar goes for depreciation; 9 cents out of every dollar received goes for interest on bonds; 15 cents per dollar of income is paid out as dividends on capital stock. The two together represent about 6 per cent. on the money invested in the property. Seven per cent. is set aside partly from the work of the selling engineer in improving earning capacity on the money invested.

Fig. 20 shows the relative growth in investment and in electricity sold in kilowatt hours for the years 1896 to 1913. The solid vertical lines represent dollars, and the shaded portions represent the kilowatt hours sold. I do not know that I can better tell the story of the concentration of power supply than that chart does. You see back here in 1903 the kilowatt hours sold was somewhere about 60,000,000, and you go on to 1913 and the kilowatt hours sold is nearly 840,000,000. I would call that change the saturation of the dollar. It shows what can be done by concentrating production for all purposes, and as a result improving the diversity factor and improving the load factor.

Fig. 19



THE DOLLAR OF INCOME

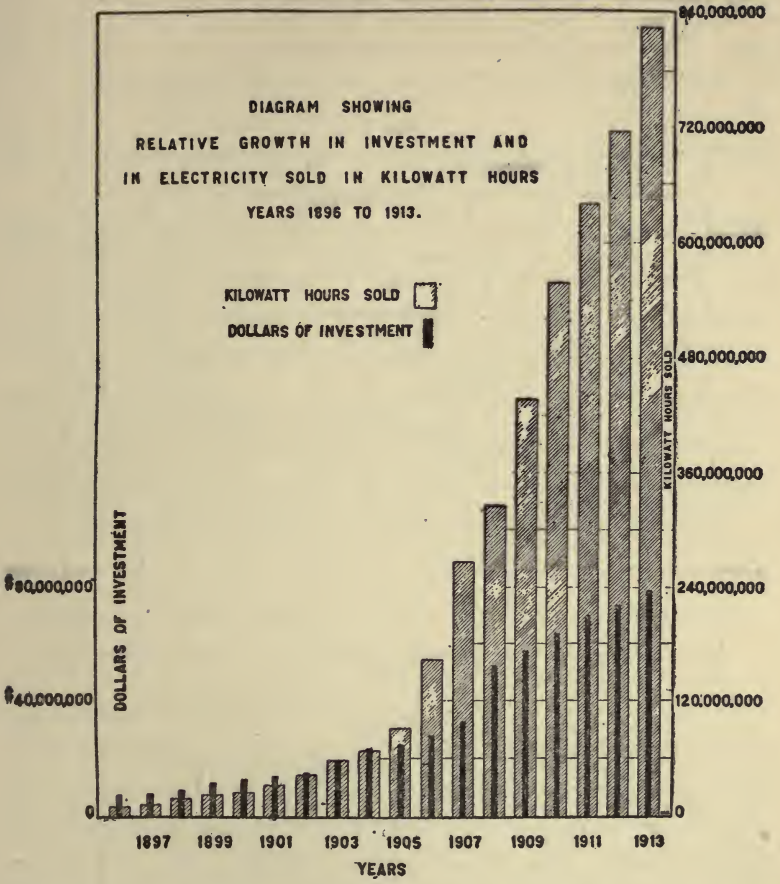
AND WHAT WAS DONE WITH IT IN 1913

Fig. 21 shows the expenditures for additions to plant in connection with the same company. The total expenditure for additions to plant through a period of five years is represented by the upper line, that supplied out of earnings by the lower full line, and that supplied by new capital by the broken line, showing that generally the additions to plant provided out of reserves amounts to the proportion of about three dollars for every two dollars that is supplied from new capital. That gives you some idea of the stability of the investment.

Fig. 22 shows the earnings from the sale of electricity per capita from years 1895 to 1913. It follows practically, and naturally must necessarily follow, the same curve which shows the relation of investment to output.

Fig. 23 should be of interest to everybody, whether they use electricity or not. One of the great, vital questions before us is the question of the

Fig. 20



conservation of our resources. This gives the pounds of coal per kilowatt hour, and the kilowatt hours generated and the tons of coal burned. You will see, as the years have gone by from 1900 to 1913, we have dropped from nearly 7 pounds of coal per kilowatt hour to 2.87 pounds, and as a result, notwithstanding the enormous increase in our output, the tons of coal burned do not increase in any such proportion. That tendency is going on continuously, partly from the work of the inventor and partly from the work of the designing engineer, and partly from the work of the selling engineer in improving the character of our load. In my judgment, in the next few years, the pounds of coal per kilowatt hour will drop something like twenty-five to thirty-five per cent., which necessarily must have an important bearing upon the value of water powers, especially in territory where water powers have low head, and consequently have relatively high investment in proportion to their product.

Fig. 24 is really a balance sheet. It is taking the figures from annual balance sheets and plotting them as curves. It is the index as to whether the power business is run economically. You will notice here that notwithstanding that the income per kilowatt hour sold goes down very steadily in the course of five years, the income per dollar of investment goes up steadily. During the same time, the cost per kilowatt hour sold goes very steadily down, practically one cent., and follows the line of income. That cost includes operating expenses, interest and depreciation. The net earnings per dollar of investment line goes steadily up.

Fig. 21

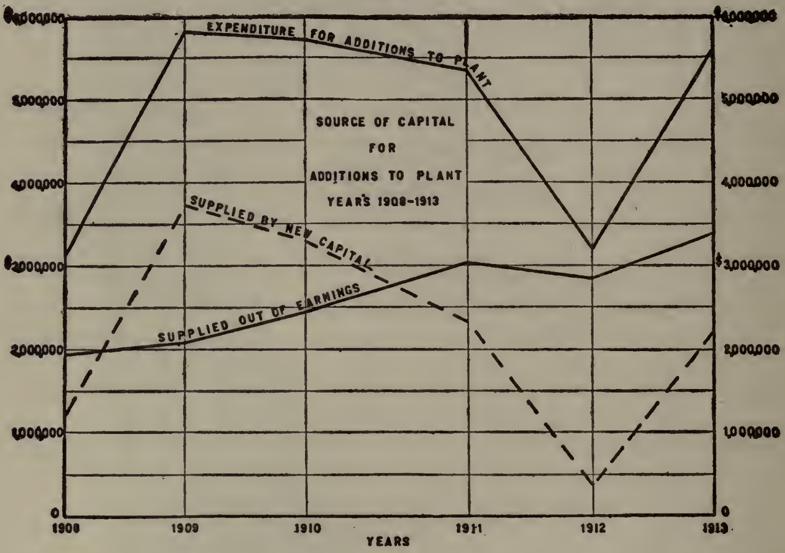


Fig. 22

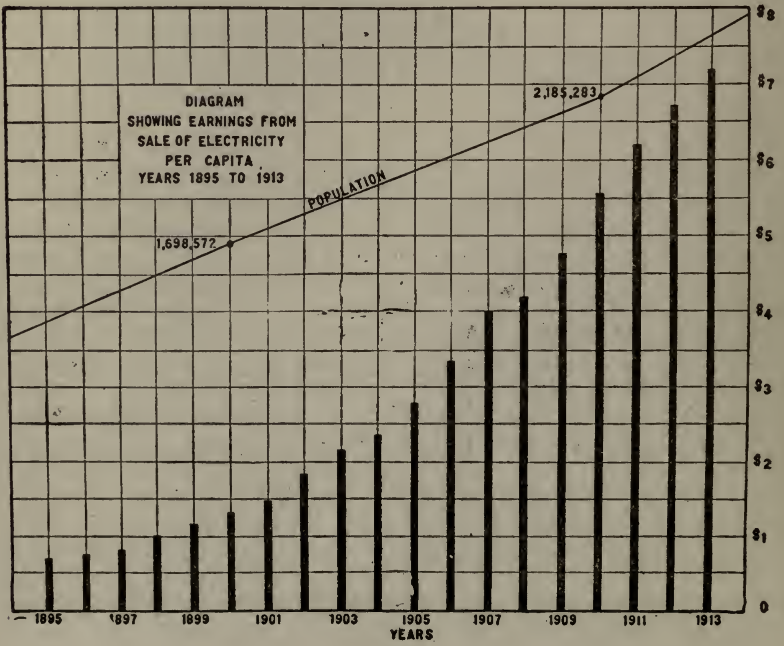


Fig. 23

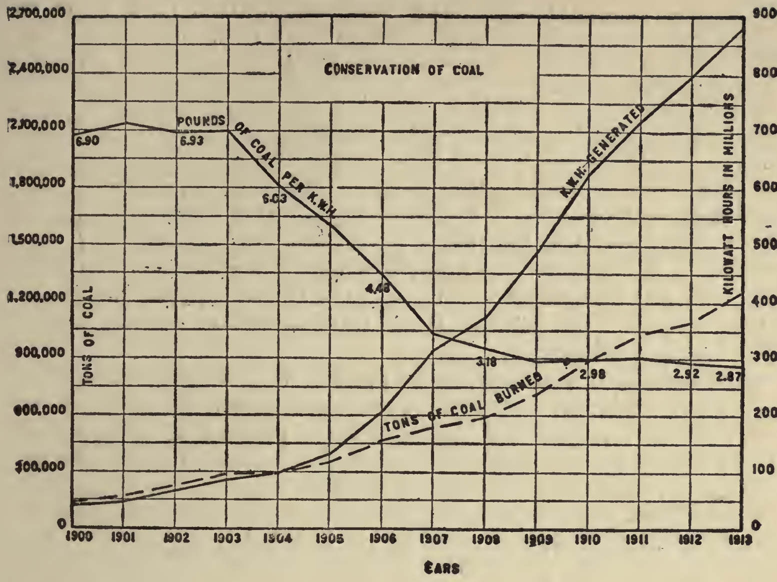
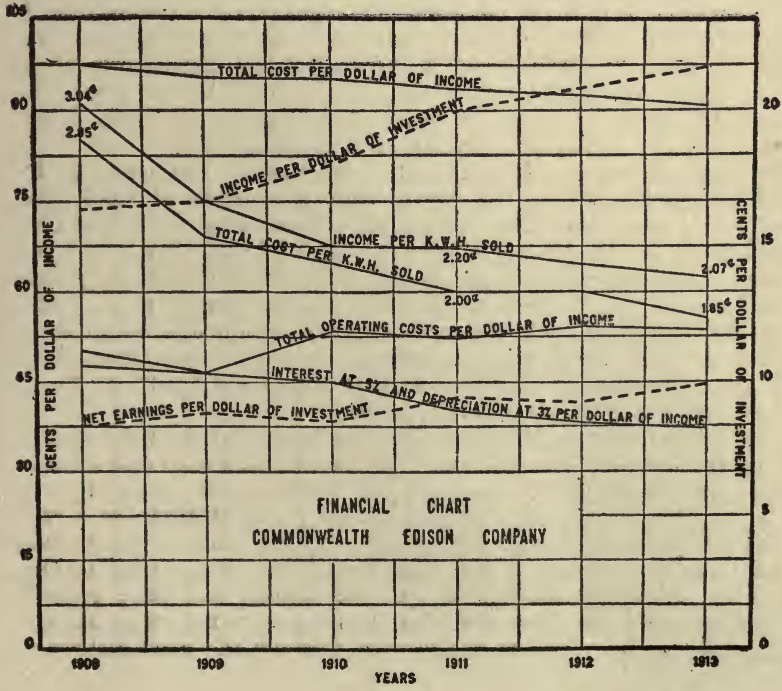

CONSERVATION OF COAL
2,700,000
2,400,000
2,100,000
1,800,000
1,500,000
1,200,000
900,000
600,000
300,000
0
TONS OF COAL
900
800
700
600
500
400
300
200
100
0
KILOWATT HOURS IN MILLIONS
POUNDS OF COAL PER K.W.H.
6.90
6.93
6.03
4.46
3.18
2.98
2.92
2.87
K.W.H. GENERATED
TONS OF COAL BURNED
1900
1901
1902
1903
1904
1905
1906
1907
1908
1909
1910
1911
1912
1913
YEARS

Fig. 24


105
90
75
60
45
30
15
0
CENTS PER DOLLAR OF INCOME
20
15
10
5
0
CENTS PER DOLLAR OF INVESTMENT
TOTAL COST PER DOLLAR OF INCOME
INCOME PER DOLLAR OF INVESTMENT
3.04¢
2.85¢
INCOME PER K.W.H. SOLD
2.20¢
2.07¢
TOTAL COST PER K.W.H. SOLD
2.00¢
1.85¢
TOTAL OPERATING COSTS PER DOLLAR OF INCOME
INTEREST AT 3% AND DEPRECIATION AT 3% PER DOLLAR OF INCOME
NET EARNINGS PER DOLLAR OF INVESTMENT
FINANCIAL CHART
COMMONWEALTH EDISON COMPANY
1908
1909
1910
1911
1912
1913
YEARS

In the previous charts, I have given you some of the results of the centralization of power production and distribution in a large center of population. As I stated at the beginning, I have naturally taken the figures of the company in Chicago, of which I am the head. They were the most available for my purpose, and I naturally am able to make such use of them as seems necessary, which I might not feel at liberty to do with the figures relating to companies managed by some of my friends.

I have purposely kept the transportation business out of any of the charts that I present to you this evening. We generate in Chicago nearly one thousand million units, and a little over one-half of our annual product is sold to the local transportation companies, and except so far as the production of that energy has a bearing upon our total cost and our total income, and our income per dollar of investment, I have purposely not discussed to-night the income from transportation, or the output on account of transportation.

I wanted to show you how it was possible to get a very large diversity of business, having an extremely good load factor, in territory where, for one reason or another, it does not seem possible to combine all the production of energy for all classes of business. I might follow the subject still further, and show you the advantages alike to the transportation companies and to the energy-producing companies, and to the community itself in massing all classes of business, as I stated in my opening remarks it was necessary to do if you desire to get the highest possible efficiency in production and the highest possible efficiency in earning capacity on the money invested.

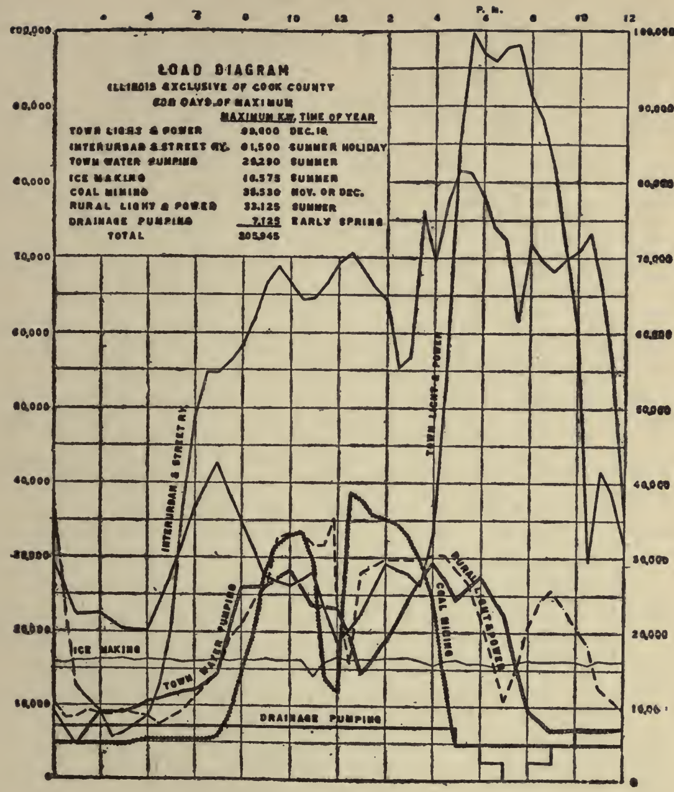
If it is possible, by a concentration of production of energy to do it to the economic advantage of everybody concerned, I cannot see why the same principles do not apply equally to small towns, villages and the rural districts. I propose to show this evening some charts that I had prepared about a year ago for an address before the Franklin Institute, of Philadelphia, on this subject of the economical distribution of energy and its use in the small communities. Naturally, I have gone to my home state, Illinois, where my own operations are relatively large and where I can get at the information at first hand.

On Fig. 25 you will find indicated the various businesses in Illinois which are mentioned on the chart—that is, outside of Cook County, Cook County being practically the territory covered by the City of Chicago.

In looking at this subject a few years ago, I found that it was possible to take a number of small plants which of themselves were practically useless because they would not earn any money, discard them, and build transmission lines through the territory they occupied so as to serve not only the two or three towns in which the old plants were situated, but to cover the entire country districts, so that you would hardly go for a mile without being able to get electric service.

I took Northeastern Illinois as my first case, and notwithstanding the large investment that was necessary for transmission lines and substations, and notwithstanding the necessity of building an economical power station and throwing away the old obsolete power stations, as a result of providing first class continuous service the investment per kilowatt of demand was kept within reason, the cost of energy was comparable with that in centers of population, say, of the second, and third grades, and the service being continuous was an invitation to the manufacturers to settle in the territory and to the farmers through the rural district to use the product.

Fig. 25



The result of my experience there led me to make an examination of conditions throughout Illinois; and I found it was possible by combining the town lighting and power business, the interurban and street railway, water-pumping, ice-making, coal-mining, drainage-pumping and the rural light and power as well as the power used for farming, to get a total load of 305,000 kilowatts without taking into account the diversity and the character of the load. I found (Fig. 26) that the difference between the maximum demand of these various businesses, some of which came in the spring, some of which such as coal-mining, came before lights went on in the winter, and rural power, which comes in August on account of the harvest time, furnished a diversity of 35.4 per cent. It is rather interesting to note (Table 4) that at the time these figures were prepared the kilowatt output was estimated as one-fifth greater than the Chicago output and the maximum about one-sixth less than the Chicago maximum, the load factor being, as shown here, nearly 50 per cent. It simply shows what can be done by massing business over large territories. The kilowatt hours are 960,786,900. The coincident maximum demand, 225,900; the diversity, 80,045, and the load factor of the combined system, 48.7 per cent. It should be understood that the figures in table 4 are estimated figures of what could be accomplished in Illinois by a state-wide combination leaving out Chicago and a few other principal cities of the state.

Fig. 26

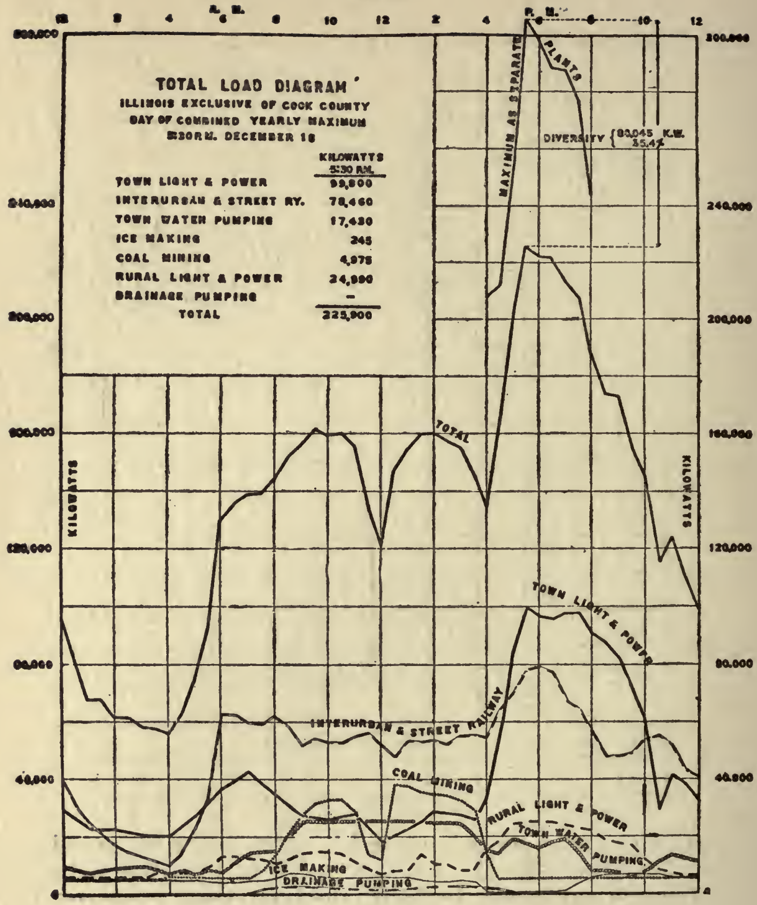


Table 4
SUMMARY FOR YEAR

| | K. W. H. | | MAXIMUM K. W. | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | Diversity | | |
| | Amount | Per Cent. of Total | For Year | 5:30 P. M. Dec. 18 | Am't | Per Cent. | Load Factor |
| Light and Power... | 238,717,500 | 24.9 | 99,800 | 99,800 | ....... | .... | 27.3% |
| Interurban and Street Railway... | 334,996,600 | 34.8 | 81,500 | 78,460 | 3,040 | .... | 47.0% |
| Water Pumping.... | 129,562,500 | 13.4 | 29,290 | 17,430 | 11,860 | .... | 50.6% |
| Ice Making........ | 62,126,300 | 6.5 | 16,575 | 245 | 16,330 | .... | 42.0% |
| Coal Mining....... | 86,571,500 | 9.0 | 38,530 | 4,975 | 33,555 | .... | 25.6% |
| Drainage Pumping.. | 7,250,000 | 0.8 | 7,125 | ....... | 7,125 | .... | 11.6% |
| Farming.......... | 101,562,500 | 10.6 | 33,125 | 24,990 | 8,135 | .... | 35.0% |
| Totals........ | 960,786,900 | 100.0 | 305,945 | 225,900 | 80,045 | 35.4 | 35.9% |

Load Factor of Combined Systems..............................48.7%

Fig. 27

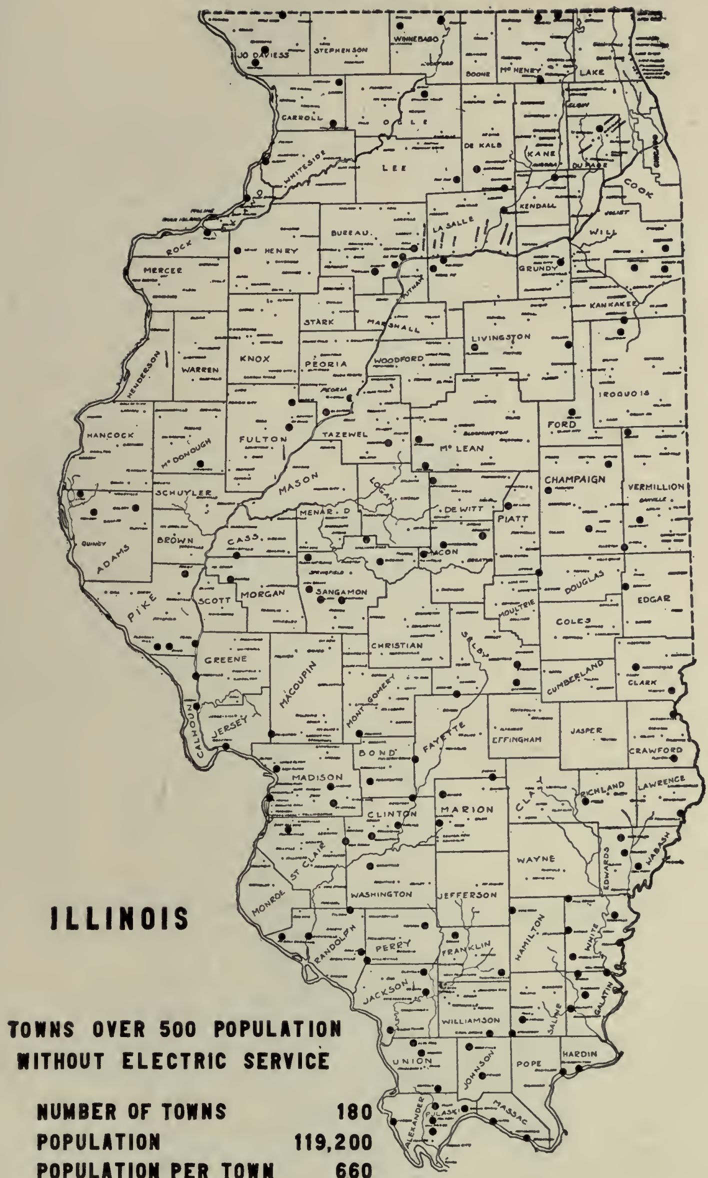


Fig. 27 is a map of Illinois showing the towns with over 500 inhabitants which have no electric service.

Fig. 28 shows you the towns in Illinois with electric service under local control. In most of these towns, you see the population is low, a little over 2,000 per town, 219 towns, and in every few of these towns, indeed, do you get 24-hour service.

Fig. 28

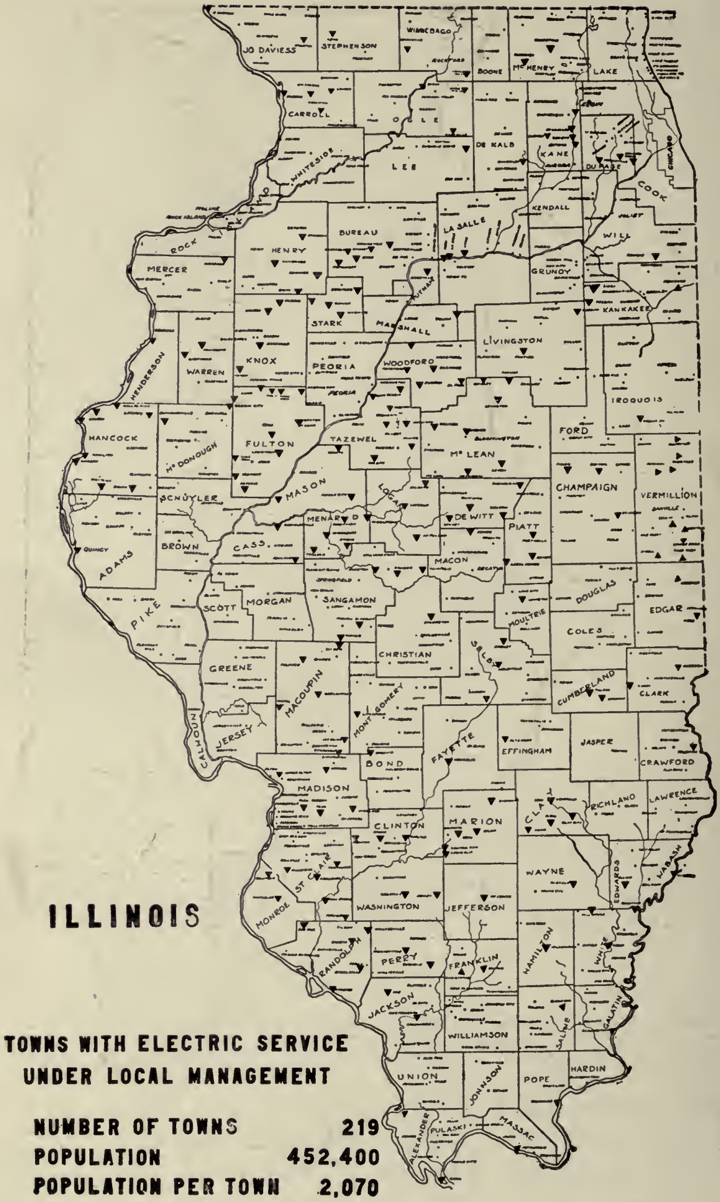


Fig. 29 indicates the towns in Illinois with 24-hour electric service under group utility management.

Fig. 30 shows the territory in Illinois which I have the privilege of operating. This territory extends from the Mississippi River on the West almost to Terre Haute, Indiana, on the East. The method of distribution is to place the generating stations in centers where there is relatively a large amount of energy required, or where the energy can be produced very cheaply. For instance, there were originally in this whole territory 63 stations; we now have but 30, and expect ultimately to have only seven or eight. The main centers of supply are at Mattoon, at Kincaid at the mouth of the coal mines, at Beardstown, at Belvidere, and several other places, and in addition we take power from the Keokuk plant on the Mississippi.

Fig. 29

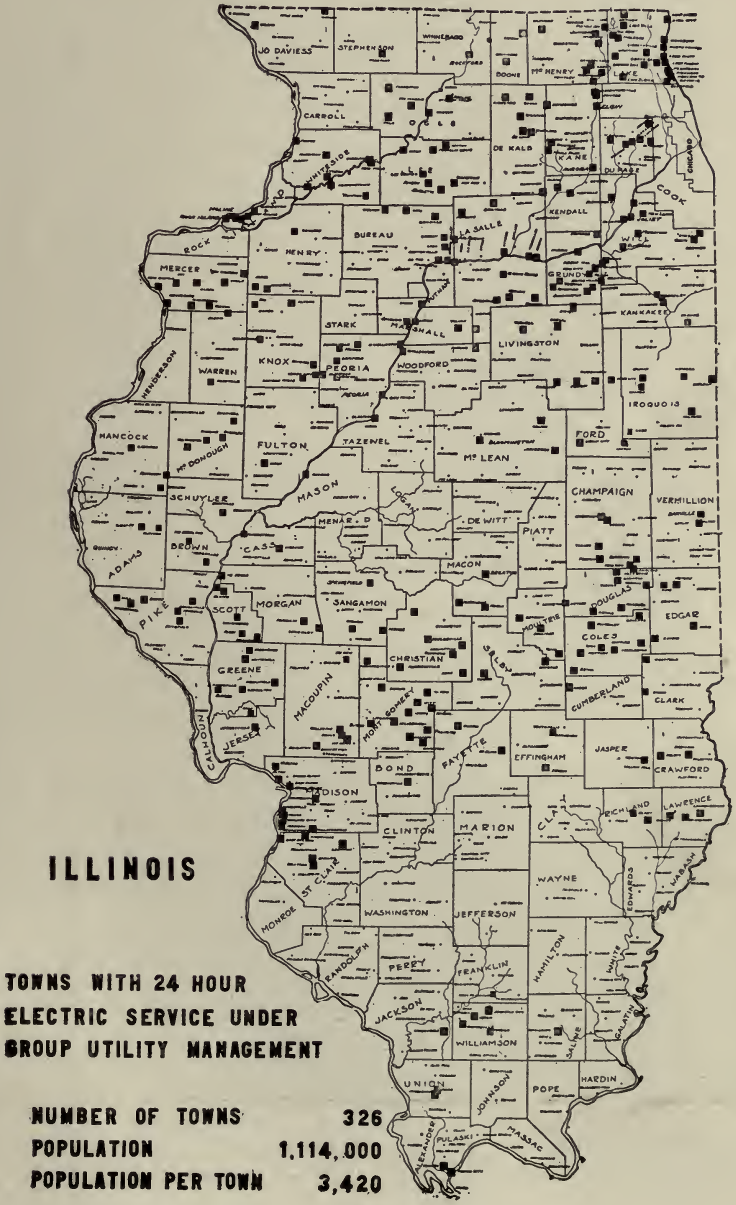


Fig. 30

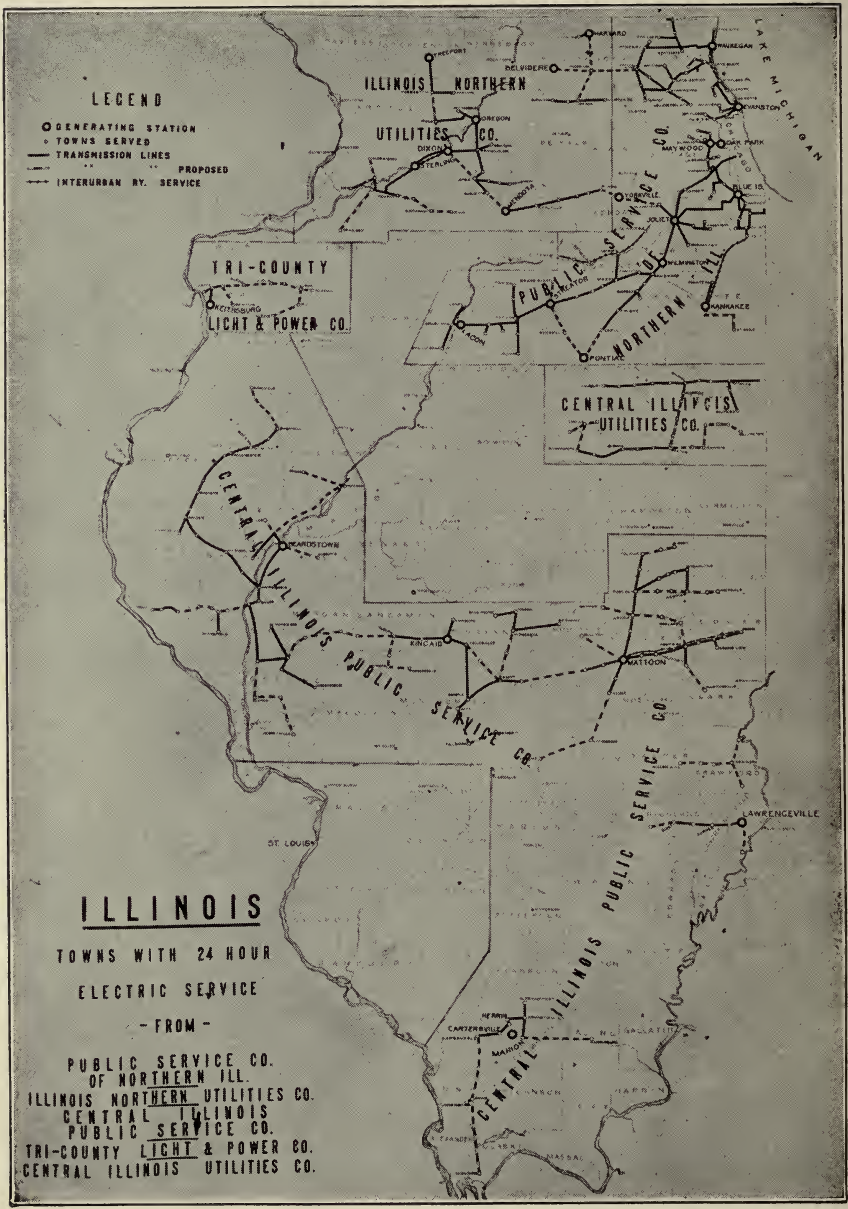
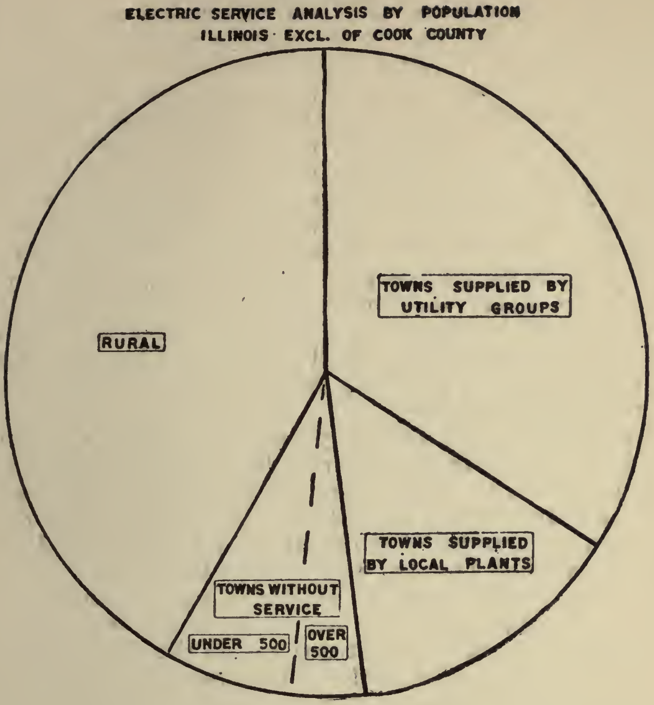

LEGEND
GENERATING STATION
TOWNS SERVED
TRANSMISSION LINES
" " PROPOSED
INTERURBAN RY. SERVICE
ILLINOIS NORTHERN UTILITIES CO.
FREEPORT
HARVARD
BELVIDERE
WAUKEGAN
EVANSTON
LAKE MICHIGAN
OREGON
DIXON
STERLING
MENDOTA
YORKVILLE
MAYWOOD
OAK PARK
BLUE IS.
JOLIET
WILMINGTON
KANKAKEE
STREATOR
LACON
PONTIAC
PUBLIC SERVICE CO. OF NORTHERN ILL.
TRI-COUNTY LIGHT & POWER CO.
KEITHSBURG
CENTRAL ILLINOIS UTILITIES CO.
BEARDSTOWN
KINCAID
MATTOON
CENTRAL ILLINOIS PUBLIC SERVICE CO.
LAWRENCEVILLE
ST. LOUIS
HERRIN
CARTERVILLE
MARION
ILLINOIS
TOWNS WITH 24 HOUR
ELECTRIC SERVICE
- FROM -
PUBLIC SERVICE CO.
OF NORTHERN ILL.
ILLINOIS NORTHERN UTILITIES CO.
CENTRAL ILLINOIS
PUBLIC SERVICE CO.
TRI-COUNTY LIGHT & POWER CO.
CENTRAL ILLINOIS UTILITIES CO.

Fig. 31



| | Towns | Population | Per Cent of Total |
|---|---|---|---|
| Supplied by Utility Groups | 326 | 1,114,000 | 34.2 |
| Supplied by Local Plants | 219 | 452,400 | 13.8 |
| Without Service: | | | |
| Over 500 | 180 | 119,200 | 3.6 |
| Under 500 | 1,713 | 216,300 | 6.6 |
| Rural | ..... | 1,366,100 | 41.8 |
| Total | 2,438 | 3,268,000 | 100.0 |

This is probably as good an illustration as I can present to you of the group operation of properties, typifying the production and distribution on the basis of concentration. There are some other properties, which I have not the figures on, operated in groups, centered at Peoria and Springfield, and some other groups in different parts of the territory that are owned by other people.

In Fig. 31, the statistics given on the previous maps are summarized. Three hundred and twenty-six towns, with a population of 1,114,000, are supplied by utility groups, or 34.2 per cent. About 14 per cent. of the population are supplied from local plants, about 10 per cent. of the population in towns, and 41 per cent. of the population in the rural territories have no service whatever. So you see that, even in so densely settled a state as Illinois, having such marvellous wealth above ground and below ground, the energy supply is confined there to 48 per cent. of the population. The population that I am particularly interested in at this time is the other 52 per cent. In the remarks which I am making to you this evening that is a subject I particularly want to address myself to.

As I stated at the beginning, this must be a monopoly business, if it is to be run on economic principles. The sound economics of it are those of monopoly, and as I have said, it is an unreasonable thing to expect that the community, whether it be the local community, or the state or the nation, should allow business of this character to go on without being regulated; but assuming that the regulation is intelligent the investor has nothing to fear, the user has nothing to fear. If companies operating over large areas have not the good judgment to run their business in such a way as to square with public opinion the commissions that exist throughout most of the states to-day are ready to protect the users of the product. If the communities are so ill-advised as to be guilty of unfairness to those who put their money into these properties, the commissions are there to protect the investor.

My own judgment is that the very best thing that has happened to our industry—it is an inconvenience to men like myself, dealing with a large number of properties in various parts of the country—but the very best thing that has happened to our industry as a whole within the last few years has been the creation of commissions to regulate the electric generating and distribution business and kindred interests.

I believe that, in the long run, regulation means protection. I know to a great many people that does not seem to be a very popular side of things at this time, in view of the treatment, or the alleged treatment, the railroads are receiving at the hands of the Interstate Commerce Commission; but I still have a firm conviction that the best thing for our securities, the best thing for the widows and orphans who buy them, and the best thing for us, is that we should stand firmly on the basis that our business must be a monopoly, and we should recognize the fact, if it is a monopoly, that it should be regulated, and then we should insist on getting fair treatment, and in order to get fair treatment we must be fair to those with whom we are dealing.

I have kept you longer than I had intended to do, but before drawing my remarks to a close I would like to say something about the possibilities of this business in the future. In my judgment, within the next few years there will scarcely be a spot in the densely settled portions of the country, and especially between here and say, the middle of the Mississippi Valley, where you will be unable to get electric service for all purposes at all times from a central system of generation and distribution.

I think it was my friend, Dr. Steinmetz, who, in a recent lecture, drew a picture of the transmission lines of the future running across the country something like the trunk lines of our transportation systems.

We are engaged in a business that probably has a more intimate relation to more classes of people and to greater numbers in the community than any other line of public service, governmental or private.

There is no reason whatever why the wheels of industry, the avenues of transportation, the homes of the poorest, and all other classes of human endeavor should not add to the greatness of the business of the generation and distribution of electric energy.

We hear, as we did recently in the halls of Congress, a representative from my own state decry the fact that there was no competition in a business where the price was fixed by a body appointed under an act of the Legislature by the Governor of the State, and a business which cannot be run economically except as a monopoly. Remarks of that kind cannot possibly be made by any one understanding the true economics of the situation. I think that much can be done in the direction of the conservation of resources, in lessening the severe conditions of labor, in improving the conditions of our people, by opening up our rural districts to manufacturers, where there is any considerable density of population; in fact, there is scarcely a direction in which one can look without seeing possibilities of development in connection with what is really the juvenile industry in public service and yet the greatest industry in public service to-day.

I am speaking here to a mixed audience. I am not speaking to an audience of engineers only, but to an audience with a strong sprinkling of young men, to those who form the great body who have the destinies of this country in their hands. There is no blow that you can deal to your motherland, there is no greater injury that you can do to yourselves than to deal unfairly with the great public service enterprises that have built up this wonderful republic, and I think that if nothing else is accomplished by my friends and myself in appearing before you, than to give you a better conception of what the leaders in industry are after than you ordinarily receive from reading the flippant remarks in the average daily newspaper, we will have rendered you, as well as ourselves, a great service.

# CENSUS RETURNS BY STATES

**Addenda A.** (*To Supplement Figure* 17)

| NAME OF STATE | Capacity Load Factor | Output per Capita | Income per K. W. H. |
|---|---|---|---|
| Alabama | 22.7 | 22 | 2.49c |
| Arizona | 25.4 | 161 | 3.56 |
| Arkansas | 12.4 | 11 | 5.45 |
| California | 33.9 | 734 | 1.59 |
| Colorado | 25.3 | 206 | 2.89 |
| Connecticut | 19.2 | 117 | 4.10 |
| Florida | 12.5 | 34 | 5.11 |
| Georgia | 17.8 | 33 | 2.01 |
| Idaho | 37.0 | 355 | 1.37 |
| Illinois | 29.3 | 205 | 2.52 |
| Indiana | 19.9 | 88 | 3.26 |
| Iowa | 14.4 | 32 | 6.45 |
| Kansas | 22.0 | 79 | 2.19 |
| Kentucky | 15.9 | 33 | 3.64 |
| Louisiana | 10.9 | 11 | 12.25 |
| Maine | 22.7 | 158 | 1.74 |
| Maryland | 5.0 | 21 | 1.37 |
| Massachusetts | 17.5 | 115 | 4.17 |
| Michigan | 23.2 | 187 | 2.19 |
| Minnesota | 22.7 | 90 | 3.72 |
| Mississippi | 14.6 | 16 | 4.02 |
| Missouri | 21.7 | 71 | 4.18 |
| Montana | 58.0 | 1015 | 1.05 |
| Nebraska | 18.6 | 47 | 4.98 |
| Nevada | 48.6 | 550 | 1.38 |
| New Hampshire | 25.0 | 293 | 1.84 |
| New Jersey | 24.4 | 151 | 2.85 |
| New Mexico | 12.9 | 28 | 5.50 |
| New York | 32.1 | 239 | 2.63 |
| North Carolina | 18.7 | 32 | 1.90 |
| North Dakota | 12.9 | 21 | 7.01 |
| Ohio | 18.6 | 84 | 2.99 |
| Oklahoma | 19.7 | 29 | 4.54 |
| Oregon | 20.7 | 87 | 2.39 |
| Pennsylvania | 15.7 | 77 | 4.14 |
| Rhode Island | 18.4 | 115 | 3.71 |
| South Carolina | 30.7 | 235 | 1.24 |
| South Dakota | 14.0 | 42 | 4.58 |
| Tennessee | 17.4 | 35 | 3.24 |
| Texas | 27.6 | 52 | 3.38 |
| Utah | 26.0 | 232 | 1.75 |
| Vermont | 21.9 | 159 | 2.07 |
| Virginia | 8.1 | 14 | 2.65 |
| Washington | 14.2 | 62 | 4.33 |
| West Virginia | 16.1 | 35 | 2.60 |
| Wisconsin | 24.9 | 92 | 2.92 |
| Wyoming | 16.1 | 79 | 6.24 |

# Investments in Public Utilities and How Held

### By W. H. Gardiner

I don't know when I have had such a task as to extemporaneously follow a man of the experience and ability of Mr. Insull, who spoke to you last week, and whom, unfortunately, I could not hear. But if you will bear with me, I will endeavor to speak extemporaneously on Public Utility Securities, feeling all the more diffidence because of the previous speaker who addressed you last week.

Among the public utilities in this country may be included artificial gas, electric light and power, traction, telephone, telegraph, express companies, natural gas, and minor forms of public service. But usually we refer only to artificial gas, electric light and power, and traction.

## The Railroads as a Yard Stick

This evening, in discussing public utilities, simply as a convenient yardstick, if I may use a yardstick which is worth twenty billion dollars, I will use the railroads in the United States.

These latter have total securities outstanding of a little over twenty billion dollars, which, on the market, are worth something over par in total. The operating gas, electric light and traction companies of the country have a total of about seven and a half billion dollars of securities outstanding. If we add to this group, the telephone, telegraph and miscellaneous public utilities, we have a total of between fourteen and fifteen billion dollars of securities outstanding. In other words, the total public utility business is very close to three-quarters as large as the entire railroad business of the country in present stature.

It is interesting to note that during the past decade the securities outstanding against the railroads have increased by fifty-four per cent.—that is, they increased by a little more than half of their previous volume during the past decade. The public utilities during the past decade have more than doubled their preceding volume, their increase being about one hundred and ten per cent. The details of this I will show you later in charts.

## The Demand Load of Electric Companies

There is one marked characteristic in public utility service, which is that public utilities have to supply their services when the public demands service. When you turn on the electric light switch, the central station and all the connecting mechanism between the central station coal pile and that switch have to be ready instantly to deliver the service you thereby demand. But if you deliver a carload of wheat at the railroad siding, the railroad does not have to take that carload of wheat instanter, that instant, and keep it moving until it reaches its destination, without stop or delay of any kind. That is what the electric light company has to do. It has to pick up your load instantly, and keep it moving until you say "This is the end of this load." That means in the electric light business, and practically to the same extent in the gas business, and to very nearly the same extent in the passenger electric railway business, that we have to handle the business instantly as distinguished from being allowed the lag which is permissible in the railroad business. Consider that were it not for this lag, the rolling stock, trackage, terminals and staff in the railroad business would have to be many times as large as they now are, to handle a given amount of business absolutely without a moment's delay.

I have elaborated on this to make the point that in the public utility business, the equipment which we have to have to furnish service is not in the main determined by the operators of the public utility companies, but is determined by the public, who, in the aggregate, tell the operators how much service they will demand. As we call it in the business, what the "demand load" will be.

## New Capital Requirements

One task of the operator is to constantly have installed and ready, equipment adequate to meet that demand, and in order to do so, he has got to issue securities in order to get the money to pay those who make the equipment and those who put it in. Therefore, in the ultimate, the increase in equipment, the increase in investment, and the increase in the securities issued by any kind of business, is determined by the customers of that business. And a curious thing is that while the customers of the railroad business have, during the last ten years, made it essential that the railroads increase their previous securities outstanding by but fifty-four per cent., they have called for an increase of one hundred and ten per cent. in public utilities.

Mr. James J. Hill, who has a very good but not entirely developed railroad in a very far from developed territory, estimates that during the next five years the railroads of the country will require $1,500,000,000 per annum for renewals and extensions. The lowest estimate put forward is $1,000,000,000 per annum on the average during the next five years.

Last Autumn, Mr. Vanderlip, of the National City Bank, gave some very interesting figures on the electric light business, in which he showed that there was a requirement for about $400,000,000 a year of new capital to be put into the electric light and power business, and the industrial businesses allied to it, in order to keep it up with the increasing public demands for service. That was a matter of $8,000,000 per week. In the gas, electric light and traction business, owing to the public demands made for additional service, our estimates are that during the next five years, we shall average to require $1,200,000,000 per annum, or about $23,000,000 a week of new money. That means that on the average each and every working day must see $4,000,000 of new capital money invested in the business, in order to keep public service up to the public demands for more service.

## Expansion a Public Demand

That, gentlemen, is one of the results of the scientific manner in which the public utilities of this country have been developed under private ownership and management,—one of the results of the kind of service they are giving the public, which automatically produces on the part of the public these tremendous increases in their demands for additional service, which, in turn, produces this tremendous demand for additional capital money, which we have got to get from somewhere, somehow, because if a public utility begins furnishing poor service, through inadequate plant, there is promptly acute public dissatisfaction. That is the sad experience of a number of isolated independent plants, who could not finance their extensions. It has been very, very disastrous to them.

One of our great problems is how this money, this $4,000,000 each day, is to be obtained; where is this additional capital to come from? We have got to have the money in order to install the equipment, in order to furnish the service demanded by the public, and our problem is how to get the money. And some of us are trying to get as much of it as we can abroad, where money is cheaper and where, by going abroad for it, we do not tie up in this business other capital available in this country for other uses.

That is the first point I want to make—that because of its rapid growth, the problem confronting the public utilities of the country to-day in the aggregate, is practically as large as the problem confronting the entire railroad situation of the country for additional maintenance and extension capital.

## Public Utilities in Holding Companies

Just in passing, let us assume that this situation confronted 3,000 little independent electric light companies in towns of from one to five thousand people, and all the little gas companies and traction companies that are, as individual businesses, financially unknown outside of their own communities. Where would they go for their capital money? Of course, they would have to go to their local bankers, because nobody ever heard of them out of town, and you can imagine that the financing of extensions as large, in the aggregate, as these, would be extremely expensive and would have to be done mostly with local funds.

Fortunately, that situation does not exist, because a great deal of business progress has been made in organizing this situation, so that it can be dealt with in larger quantities and in the largest money markets of the world.

In the electric light buiness there are about $2,111,961,000 of securities outstanding, of which 82.5%, or $1,741,958,000, are organized into holding companies.

In the gas business, there are something over $1,320,000,000 of securities outstanding, of which 66%, or $874,000,000, are organized into holding companies.

In the traction business, out of a total of $4,043,663,000, there is about 81.4%, or $3,281,000,000, organized into holding companies or affiliated with holding companies. Thus, out of a total of about $7,500,000,000 of gas, electric light and traction capital, about $5,897,000,000, or about 78.5%, is now organized into approximately one hundred and forty independent holding companies, whose securities are now held throughout this country and Europe.

## Banks as Public Utility Bondholders

That puts an entirely different phase on the getting of new money, from that of each little company having to get it locally. Here I would like to call your attention to an index of the trend of the times. The other day I saw a report of the Comptroller of the Currency for the last fiscal year, in which were given the resources and liabilities of the reporting banks. It showed that during the year the individual deposits had increased by about $452,000,000 in the aggregate. The banks had decreased their state, county and municipal bond holdings by an aggregate of over $33,000,000; they had decreased their holdings of railroad bonds more than $101,000,000, and they had increased their holdings of other public utility bonds, such as gas, electric light, traction, telephone and telegraph by nearly $118,000,000, this increase being nearly 20% of their total previous holdings of public utility bonds, whereas the increase in individual deposits above quoted was but 2.65%.

That is rather an interesting index of the trend of bond holdings.

## How Ownership of Small Companies is Vested

Another rather interesting thing is, what happens when an independent public utility is acquired by a holding company. The organization with which I am connected has examined during the past three or four years about a thousand public utilities of one kind or another, making a detailed physical, engineering, commercial and financial examination and audit, usually with a view to purchase. In towns of less than forty or fifty thousand inhabitants, we usually find that the company is owned by from one to ten or twelve men, which means that the president of the local bank, the president of the local trust company, and the big insurance man in town, and the big dry-goods man in town, and one or two retired capitalists, own the whole thing themselves, lock, stock and barrel, and any additional financing that has to be done to meet increasing demands for service, they have to do themselves, either through their local financial institutions or through their own check books. We also find that when an independent company is locally owned, its shareholders have holdings amounting to, on the average, between $50,000 per shareholder and $150,000 per shareholder. All the stock is held among a few people in large blocks.

## Public Utility Holding Companies Distribute Ownership

When a company is bought by a holding company, a very different condition comes about. You will be surprised, perhaps, when I tell you that the holding company is the means of making an opportunity for the small investor who desires the maximum diversity to invest in the public utility business, and later on I will show you graphically some reasons which make it rather advantageous to do so.

One holding company I know of has about 25,000 stockholders, many of whom are abroad. This latter fact means that foreign capital, through them, is supplied to this country to carry on its development. The holdings, instead of averaging somewhere between fifty and a hundred and fifty thousand dollars per shareholder, average but $6,300 per shareholder, which gives a very broad distribution; in fact, it is one of the broadest distributions that I could note casually.

I ran through a list this afternoon, and the only broader distribution which I noted was that of the Pennsylvania Railroad, which, instead of having $6,300 per shareholder, has a distribution of but $5,840 per shareholder. The Pennsylvania Railroad, as many of you know, is famous and has been for decades famous as a road which is owned "all up and down the line," and all over the country; in fact, the average of all the railroads listed on the New York Stock Exchange shows a holding of $13,320 per shareholder, as against $6,300 for the public utility holding company mentioned. The United States Steel Corporation, which is another corporation noted for the very broadly distributed holdings of its stock, has a distribution of $7,000 per shareholder, which is very broad indeed, much broader than the average railroad, and nearly as broad as the public utility mentioned.

But the investor in a great railroad is investing in one continuous and inter-dependent system; the investor in a great industrial is investing in one business, having, perhaps, many active plants, but none the less one business from the market point of view. On the other hand, an investor in any one of the great public utility holding companies is really simultaneously making an investment, be it only of $100 in total, in, for instance, an electric company in Oregon, a gas company in Maine, a traction company in Texas, and in fifty or a hundred other gas, electric light and traction companies in twenty or thirty or forty other states. The superior diversity and safety of his investment is obvious.

I have been speaking of the underlying companies and holding companies. It might perhaps be well to say a few words on the different classes of securities. The securities of one of the operating or underlying companies may be one or more classes of bonds, usually of unfortunately small authorized issues. Following these, there are preferred and common stocks, which will be in part or in whole in the treasury of the holding companies. The holding company itself will have outstanding, rarely bonds, sometimes term notes, preferred stocks and common stocks.

## Closed and Open Bond Issues

In speaking of bonds, some of us believe that of late we have noted some interesting fundamental changes in the bond situation. I spoke a moment ago of unfortunately inadequate authorized issues of first mortgage bonds. People ten or more years ago had an idea that the business would increase during the bond period by, say, about fifty per cent. or seventy-five per cent. perhaps. They never expected that it would double and treble, as many public utilities have done during the past decade. Therefore, they find themselves with an inadequate bond issue, and a business requiring much more capital money, a business vastly more valuable, and vastly larger than was ever contemplated at the time the original bond issue was gotten out, sold and bought. Such a closed bond issue of limited amount is really like a clog on the progress of the company, because it closes off the company's opportunity to finance its extensions through the issue of adequate amounts of underlying primary securities.

During the past few years there has been a notable increase in Public Service Commissions throughout the country, which usually authorize the issuance of additional securities, and to a greater or lesser extent, have an eye on the uses to which the monies realized from the securities are put in the way of extensions, etc. Public regulation fosters public equity. It also gives to regulated monopoly, to thoroughly supervised monopoly, a stability and a security of earnings, and later I will show you figures and diagrams of notable steadiness in earnings, which, in reality, make the bondholder much more interested in the continuity of interest than he is in there being just exactly the specified piece of plant equipment represented by his bond when his bond was issued, and he bought it, and the machine his money paid for was originally put in. If you have a going concern which continues and has every reasonable assurance of continuity in business, with reasonable profits from its business, the bond of that concern is really much more secure than if it is based solely on a piece of physical equipment, save for its salvage value, useless in any other business, practically useless in any other place, subject to more or less physical depreciation, and possibly sudden damage, as by flood or explosion.

The first thought that occurs to some people in this connection is that our close or closed bond issues will gradually be superseded by open bond issues, the idea being a loan against the paying capacity of the concern and its property, which loan it is not expected at any time to pay off. As a matter of fact, a bond issue now-a-days is very seldom really paid off. It is usually re-financed at more or less expense, sometimes resulting in an improvement, and sometimes the reverse, depending on momentary money market conditions at the time of the re-financing. That is a situation which the passing of the closed mortgage may eliminate.

## How Bonds Originated

There is another phase of bonds that is interesting some of us. If you look back in the history, the bond—our bond as we know it to-day is a descendant of the old English mortgage (Mort gage—gauge against death), wherein a man gave a paper to his creditor assuring his creditor the collection of his debt from his property in the event of the man's dying. As property in those days was practically limited to real estate, that was the basis of the real mortgage as distinguished from the chattel mortgage. Such also was the basis of the bond, the first mortgage bond. First mortgage bonds were originally issued in industrial undertakings against the real estate only. I remember reading some discussions of the early railroad days of England, in which it was decided that only the real estate of a railroad was proper matter for a mortgage bond issue. None of the equipment of any kind whatsoever was then considered proper matter for a mortgage bond. In the early industrial days in England, and to a lesser extent in this country, if a man had a shoe factory, the principal asset was the real estate and the buildings, and if the shoe factory failed, you could go in there with a hammer and a broom and sweep it out, and in a week have a blacksmith shop there, the real property bonded being equally valuable in either business.

A point I want to bring out by that simile is that in the early days specialized equipment represented a very small fraction of the investment covered by a mortgage.

### Paramount Importance of Earning Power

As our industrial processes have become more and more refined, they have become more and more specialized in their equipment. To-day, for instance, in a steel mill the real estate and buildings are of a negligible amount in respect to the total cost of the equipment installed on the land. But that equipment is perfectly useless except to make steel according to the process designed, and yet that is what is back of the mortgage in some people's minds, and in some people's minds they insist on having that back of it. But really that which makes such a mortgage of value is not that specialized equipment, the salvage value of which is thirty-three per cent. or twenty-five per cent. or ten per cent. Its real value and permanent value is the sustained earning power of that property—the sustained earning power of that equipment. It is the ability, year in and year out, decade in and decade out, to continue earning interest and dividends and piling up surplus, and at the same time meeting its extensions.

So that there are some of us who think that, just as in the past we have changed our point of view towards a bond, from considering that it should be merely a real estate instrument dealing with land and buildings to an instrument covering real estate and all other tangible, fixed assets, so we will eventually pay much less attention to the schedule of tangible assets and much more attention to the earning powers and continuity of earning power of the bonded property.

Mr. J. P. Morgan said that he did not loan money so much against collateral as against character. He might have said that he loaned against ability to earn and character to repay. There is an analogy between his modern viewpoint and what I have just said of bonds.

### Merit of the Collateral Trust Bond

There is just one other class of bond that I want to mention. I won't attempt to go over the various points of view towards a holding company, its advantages from a stock point of view, in the issuance and marketing of securities, but I just want to mention the probable rise of the collateral trust bond.

There are a number of collateral trust bonds in the country, and there is an opportunity to do some very sound economic financing when the investing public becomes better acquainted with soundly constructed collateral trust bonds, because the same diversity factors of security and earning power that come in in the entire holding company situation, also are present in the collateral trust bond if it is properly managed and properly put together. I merely want to mention that, as I think it will be one of the important fiscal instruments of the future.

## Practical Financing

We will now take up an entirely different aspect of the subject,—public utilities from the point of view of the investor. There is a very, very interesting situation in the market. I have told you of the demand for increased service originated by the public served. Our problem is to get money to invest in properties to pay for the additional equipment that the properties have called for, according to additional calls for additional service, made by the public.

It is very interesting from the point of view of a practical operator who has the public demanding more service, more cars, additional power, more gas, and it is very interesting from the point of view of the banker who has to find the funds somewhere, to have the various people state this, or that, or the other academic method whereby additional money should be obtained for this business. These academicians do not suggest guaranteeing that they will themselves do it, but they insist that securities ought not to be issued except at par, that they never ought to be more than five per cent. or six per cent., that they never ought to increase or decrease in value, and that various other qualities ought to appertain to them, according to the academic point of view. The other day I had one of these delightful theoretical gentlemen in my office, who told me how he knew securities ought to be issued, and I said—"Well, now, it had not appealed to me in quite that way; the point of view that occurred to me was that what we wanted to do was to issue our securities in such a way as to get the money when we needed it, as cheaply as possible. Just that; just to get the money to invest wisely, as cheaply as possible, in the long run and at the present moment."

## Disadvantage of Issuing Stock at a Premium

If you will just think of the issuance of securities from that point of view, I think it will explain a whole lot about so-called "stock-watering," and will show you the great disadvantages that, for instance, some of the Massachusetts companies have to undergo, where they are obliged to issue securities on some of the Massachusetts companies now at $200 and $215 and $220 of cash paid into the treasury per $100 par value of stock issued. That is standing up so straight that they lean over backwards and touch the floor.

The result is that they are having to pay more and more money net in charges than they otherwise would have to pay. This is so because investors prefer a 5% stock at, say, 100 to a 10% stock at 200.

The point is to issue securities in such terms as to get the money competitively in the open money markets of the world as inexpensively as possible. There is the whole problem.

And naturally a holding company goes all over the world if its companies need money—into all of the money markets of the world, and finances this class of security in this market, and that class in that market, and the other class in the other market, time and time and again rotating them, depending entirely on the money conditions of the world at the particular time at which they are carrying on the transaction.

Broadly speaking, the values of securities may be classified as intrinsic and as intangible. Their total relative value will appear in their open market price over long periods, except for such special conditions as "legal investments" or such disadvantages as lack of familiarity on the part of investors.

## Intrinsic Values

It is such a situation and some of the relative intrinsic values that I will now endeavor to show you by some tables and charts which I originated,

Average figures for large groups of securities show the curious market conditions set out in the following table.

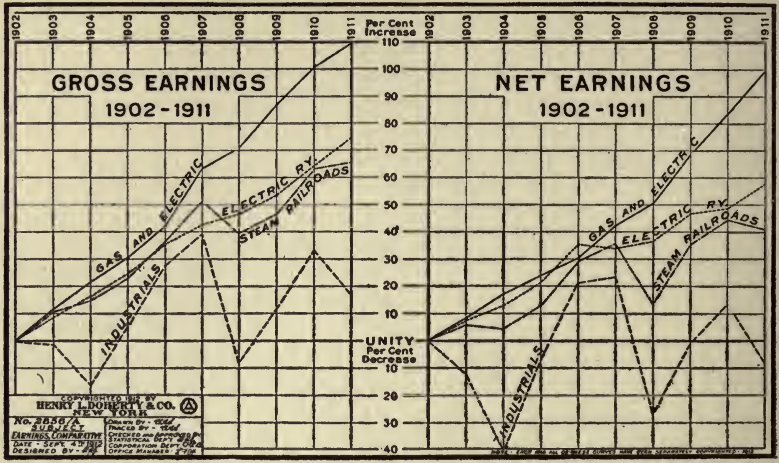
| CLASS OF SECURITIES | MARKET PRICE IN $ | NET EARNINGS IN % | RISK OF RECEIVERSHIP IN % |
|---|---|---|---|
| STEAM RAILROADS | 120 | 4.25 | 1.84 |
| INDUSTRIALS | 94 | 7.79 | 2.07 |
| PUBLIC UTILITIES | 90 | 8.45 | 0.37 |

That a group of securities earning but 4.25% should market at 120 shows that it is held in high esteem by investors. And that another group of securities earning 8.45% should on the same market sell at but 90, shows that it is in much lower esteem with investors. But why have public utilities been held in lower esteem than have steam railroads?

Let us assume that they have been considered less secure. I made an unusual compilation, embracing all the railroads and all of the gas and electric companies in the United States, over a period of thirty years. In effect, it shows that the liability of a railroad going into the hands of a receiver is five times as great as for a public utility, the railroad risk being $1.84 per annum per $100 of securities outstanding, whereas the risk for public utilities is but 37 cents per $100 of securities.

## Ten Years' Record of Earnings

The following chart shows the relative increases and decreases of the gross and of the net earnings of steam railroads, of electric railways, of gas and electric companies, and of industrials, for a period of ten years.

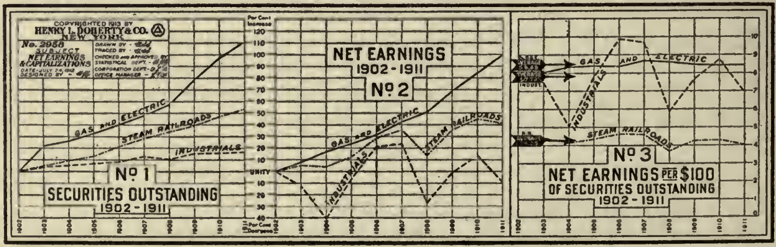


These charts were calculated from the gross and net earnings of all the steam railroads of the United States, of all industrials listed on the New York Stock Exchange, which could be traced back to 1902, and whose aggregate gross for that year amounted to $1,250,000,000; also, from the gross and net earnings of the electric railways and the gas and electric companies in the larger cities of the country, without selection, but exclusive of New York City.

All of these barometer sets of figures were standardized at unity for 1902, and from this basis the percentages of their subsequent increases and decreases were calculated. The resulting curves prove that the gross and net earnings from the gas and electric business increased the most rapidly, and that they are practically unaffected in their rate of increase, even by such panic conditions as those of 1907 and 1908.

## Earnings and Capitalization

The first section of the next chart shows on a similar percentage basis the relative increases in the securities outstanding of these same groups of companies.



From the data of capital and net earnings from which sections Nos. 1 and 2 of this chart were figured, the net earnings per $100 of outstanding securities were derived year by year, and averaged for the ten years. These are graphically shown in the third section of the chart.

In spite of an increase in railroad securities outstanding, amounting to fifty-four per cent. during the last ten years, the net earnings of the steam railroads have been fairly steady. But they have been surprisingly low (averaging 4¼%) for this ten year period. And yet the chart in this item is but a confirmation of the report of the Railroad Securities Commission, of which President Hadley of Yale was Chairman, which says: "The ratio of interest and dividends to outstanding bonds and stocks of American railroads is not quite 4½ per cent. in each case."

The large industrials show an increase of securities outstanding amounting to less than twenty per cent., and their average net earnings for the ten year period are 7.79 per cent. per annum; but these net earnings are subject to the violent fluctuations shown by the charts.

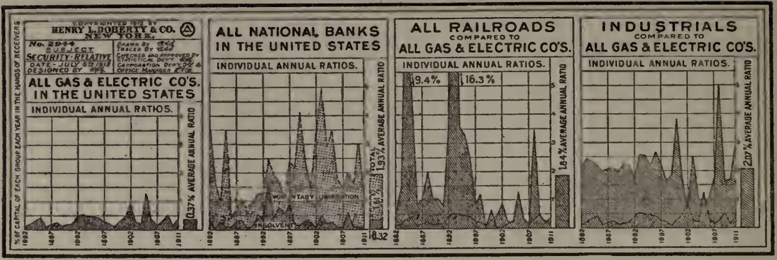
The high average rate and steadiness of net earnings of gas and electric companies is remarkable. That during the ten years they have never dropped below eight per cent. on the securities issued, in spite of the fact that these latter have increased by 110 per cent., or double the railroad expansion, should be of great interest to investors. But that steam railroads could finance their extensions, with their net earnings averaging but 4¼ per cent., while public utilities have had to maintain their earnings to an average of 8½ per cent., is evidence that, even of late years, it has cost more money to get new capital to invest in the extension of public utilities than in that of railroads, presumably because of the supposed security of the latter and because of their "marketability."

From the foregoing studies of the net earnings of these different groups of corporations, it seems evident that the statements made in the first table shown are conclusive; in fact, one should add to these statements a comment on the remarkably steady increase in the earnings of public utilities as compared with the fluctuating earnings of railroads and industrials.

## Security as Tested by Receivership

On the question of the relative security of different groups of securities, an even more extensive study has been made, covering a period of thirty years. In such a broad study it was obviously impossible to determine what the actual cash losses through bankruptcy proceedings had been. But it was possible each year, by thorough research, to arrive at the proportion of total securities in each group which had been in the hands of receivers during that year, and thus establish a relative receivership risk year by year per $100 of securities outstanding.

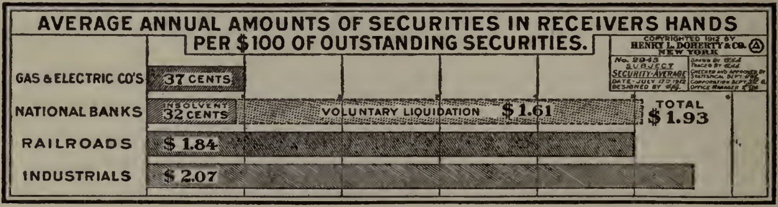
The next charts show for each year from 1882 to 1911 the percentage of capital in the hands of a receiver, to the total contemporaneous capital of each group.



For national banks two ratios are shown, (a) the percentage of national bank capital foreclosed by the Government because of banks found to be insolvent, and (b) the percentage of national bank capital voluntarily liquidated. This research included all of the national banks in the country, all of the steam railroads in the country, all of the gas and electric companies in the country, and all industrials large enough to have been mentioned in any of the manuals or chronicles.

In total it involves the equivalent of over five hundred and forty-five billion dollars ($545,310,371,443) of capital, of which over nine billions, five hundred and seventy-eight million dollars ($9,578,713,793) were found to be insolvent, or an average for the whole of $1.75 of every $100 of stocks and bonds outstanding.

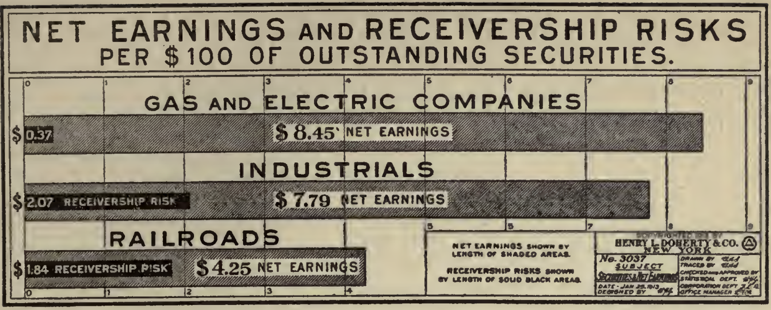
The next diagram illustrates the relative average annual risks as deduced from the chart just shown:



From this it is apparent that investments in gas and electric companies are, on the average, more secure than are the stocks of carefully supervised national banks. It is also apparent that these securities are about five times as free from receiverships as are steam railroad securities, and that they are over five and one-half times as free from receiverships as are investments in the larger industrials.

## Investment Safety as Related to Earning Power

Such broad studies lead us conclusively to an unexpected situation. In the next chart the net earnings and receivership risks, as deduced from all of the foregoing, are graphically brought together:



NET EARNINGS AND RECEIVERSHIP RISKS PER $100 OF OUTSTANDING SECURITIES.

Herein we see that that group of companies which has the least receivership risk has the largest net earnings per $100 of securities outstanding.

In view of all these statistics, it is difficult to understand why, as I have previously shown, public utility securities sell at 90, while railroad securities sell at 120, excepting by the supposition that the investing public is intimately acquainted with railroad securities, but knows comparatively little of public utility securities.

## Conclusions

In conclusion, I want to leave certain salient facts in your mind. The gas, electric and traction business of the United States now involves about seven and a half billion dollars of invested capital, of which nearly six billion dollars is organized into about one hundred and forty independent holding companies. It is nearly half as big as the total railroad business of the country. But as it is growing more than twice as fast as are the railroads, its needs for additional capital are as great as those of the entire railroad business of the country. To meet the increasing demands of the public for more public utility service will require, on the average, one billion two hundred millions of new capital per annum, or four million dollars per working day.

Were it not for the present organization of over three-quarters of this business into holding companies, it would be next to impossible to get for all these small plants the great aggregate sums necessitated by the public demand for plants of greater capacity and broader service. But, organized into holding companies, each of these plants supplying only its own strictly local market for public service, can be financed, not locally, but as a unit of a larger company in the greatest money markets of America and Europe.

The prospects for thus accomplishing the colossal task of raising for this business each year over one billion dollars,—an amount greater than the principal of the total interest bearing debt of the United States—are good. The intrinsic reason why we face this task fearlessly through holding companies is that, on the average, our securities now sell at 75 against the railroad standard of 100 (90–120), whereas public utilities are five times as safe (0.37–1.84), and earn twice as much (8.45–4.25). When the now rapidly spreading knowledge of these fundamental facts becomes general among investors, our securities will come into much greater demand, their prices will advance, the rates necessary to get money into the business will decline, and the money seeking investment in the business through holding companies will rise to more than an ample supply, simply because the business is pre-eminently sound and assuredly profitable.

# Future Regulation of Public Utilities

### By William D. Kerr

Your Chairman has called attention to one of the salient features of public utility regulation. Probably the primary purpose of the Public Service Commission is to effect a balance where, from causes which seem to exist quite naturally, there is no balance. The balance, as he has expressed it, is one between the consumer of public utility services and the proprietors of the services, the stockholders. It is a circumstance which is frequently lost sight of, that a balance must be preserved. The commission becomes a clearing house for contending ideas as to the side toward which the pendulum ought to swing.

The subject which has been assigned to me this evening is, "The Future Regulation of Public Utilities." I am not a prophet, nor the son of a prophet, and I do not expect in the course of this evening's talk to be able to outline the exact future of public utility regulation. The best I can hope to do is to give you some ideas or suggestions, as to the factors which in some measure are likely to control the developments of the future. The substantial part of what I shall say I have divided into three topics. The first is Regulation and Its Functions; the second is Public Service Economics; and the third is The Factors Influencing the Future.

## Convenience, Comfort and Welfare of Public

The first thing I wish to call your attention to is the underlying principle which should be kept in mind whenever this subject is discussed. We are dealing primarily with the convenience, comfort and welfare of the public. These industries exist for the convenience, comfort and welfare of the public, and for no other reason. All interests are subordinate to these. To emphasize my point, I shall read a brief extract from a recent address by one of the foremost exponents of public utility regulation in this country. I refer to Mr. Halford Erickson, one of the original members of the pioneer Wisconsin Railroad Commission. I think it fair to say that Mr. Erickson has done as much as any other single individual in the country, if not more, to put regulation on a sound, workable basis. I am very glad to be able to bring this brief message from Mr. Erickson, because it has been my privilege to be associated with him and to have known him since the beginning of his public utility work in Wisconsin. In speaking before the American Electric Railway Association in January of this year, Mr. Erickson said:

"The sole reason for granting rights and privileges to a utility is to administer to or promote the convenience, comfort and welfare of the public. There is no other ground either in law, economics or morals upon which franchises should necessarily be granted."

Now, if we can keep this idea in mind as the evening progresses, we may have a better understanding of what the future of public utility regular tion is to be.

## Regulation and Its Functions

We are considering this evening the regulation of public utilities. It is desirable that we have a clear understanding of what we mean by regulation and the special functions of a system of regulation. The present evidences of regulation are commissions in all states of the Union but three, charged with the regulation of railroads and to some extent of other public utilities, and in about twenty-nine states of the Union commissions charged with the regulation of the so-called local utilities—electric, gas, water, street railway, etc. In two of these states the public utility laws are not in operation, having been suspended, awaiting a referendum. We have the Interstate Commerce Commission, which for almost thirty years has been regulating the railroads of the country. Regulation exists. We have tangible evidences of it in the form which I have indicated.

## Three Kinds of Regulation

Now, let us remember that there are several kinds of regulation. We have regulation in other forms than the commissions. First we will speak of regulation by competition. The old idea of regulating public utilities was to set up a competitor. When public utility A was misbehaving, the idea was to give a franchise to public utility B, and while B biffed A, and A biffed B, the public would enjoy low rates and excellent service as a result. The old idea did not work; it was found that very soon A and B got together and the public footed the bill for the increased investment and wasted investment. It was found that if the public was to secure any benefits at all from that process, it would be necessary to start company C just as soon as A and B got together; and as soon as C started business, they all combined. In some cases this actually has been done. Company after company has been put on its feet and allowed to exist for a time, the inevitable result being that consolidation set in and an effort was made to let the public, by increased rates, take care of the costs which it had been responsible for.

There are a number of efforts of this kind which should be closely scrutinized. In some parts of the country, and at some times, we have had efforts to regulate public utilities by starting competing or so-called competing properties owned and operated by the public. These operations have been conducted in some cases under the auspices of municipalities, and in other cases under the auspices of State Governments. As an example of the first class, we have Cleveland, which is on the point of putting into operation a large electric generating and distribution system. As an example of the State-owned and operated system, we have the project which started in Ottawa, Ontario, and which is now spread over practically the entire Province of Ontario, under the control and jurisdiction of the State of Ontario.

Now, these projects, as I say, must be scrutinized carefully to ascertain if they are really competitive enterprises. If the enterprises are so conducted that they are not bearing their full burden of cost, they cannot be said to be competitive enterprises; if they are conducted on the basis of a principle which does not require them to pay their own way and take care of themselves, they are not truly competitive enterprises.

### Public Plants Not Competitors

The public service corporation is obliged to take care of itself. It must pay its way, it must pay for the capital that goes into the business, it must pay all of its operating expenses and it must pay taxes. If it does not, it cannot exist beyond a limited time. The municipal and the state authorities, however, very frequently have to resort to taxation and to the public purse to take care of deficits which are incurred in operation, and which result from the failure of the plant to take care of itself.

I had an opportunity some weeks ago to listen to the superintendent of the new electric plant in Cleveland while he explained what is proposed to be done in Cleveland. Part of his explanation had to deal with an exposition of what has been done in Cleveland. They have one or two relatively small electric plants operating in their suburbs at the present time, and it developed in the course of his talk that upwards of $200,000 has been appropriated for one of the plants from funds raised by taxation. No return is paid to the city for this amount of money; there is no expectation that the city will be repaid for its advance of this $200,000. From all appearances this is a gratuity conferred upon the municipal plant by the good-heartedness of the people of Cleveland.

To make a comparison between a plant of that kind and a plant which is paying its way, a plant which is responsible to its owners for the results which it makes, is an impossibility; you cannot compare the two. They are incomparable. You can dispose of electric service in great quantities if you wish to give it away. That of course is an extreme; but if you give part of it away, you can probably effect larger sales than if you charge every consumer his full proportion of the burden which he throws on the business.

Cleveland is a case where strict scrutiny of the business that has been conducted in the past and of the proposals for the future, reveals the fact that it is not proposed to throw upon the plant itself the full burden of the cost of the service. To speak of the Cleveland project as a competitive one seems ridiculous.

### Regulation by Legislation

Next we have direct regulation by legislative bodies. An example of this is the enactment in a number of states of the Union of two-cent passenger fare laws. In these cases the Legislature undertakes to say directly what is a reasonable charge and to impose that charge upon the public utilities. There is one great fundamental objection to direct regulation by legislative bodies. The legislative bodies are unwidely, they are large, they meet but for a relatively small portion of the time, and they have no regularly organized facilities for the gathering of the information—for the gathering and the digestion of the essential economic facts some of which we will consider later.

Another example of direct regulation is found in the Full Crew Law which we have in New York State, in the State of New Jersey, and in others of the eastern states as well as many of the western states. This legislation is clearly pernicious, because it is not based on an analysis of facts. It may be desirable that this particular train have a larger crew than it has, because there are some peculiarities to this train; but here is a train which does not have the peculiarities of the other. For the Legislature to say that all trains, the first train and the second train, shall have a crew of a certain fixed, definite size, is not productive of general good and is not conducive to the convenience, comfort and welfare of the public. Another example is the fixing by law of inflexible illuminating standards for gas. Gas no longer is sold as an illuminating but as a heating device, light being produced through heat. But in many states gas rates are kept at unduly high figures by absolute and inflexible laws which fix illuminating standards.

## Regulation by Administrative Boards

The third kind of regulation which we will consider is regulation by means of authority delegated to administrative boards. This is the form of regulation which we are accustomed to think of generally as constituting regulation. Our Commissions—the Public Service Commissions—in the State of New York, the Railroad Commissions in some states, Boards of Public Utility Commissioners in others—the name signifies nothing—all of the commissions are constituted on practically the same basis, exercising power conferred upon them by the Legislatures. These Commissions are of two classes. The first is authorized usually to make investigations and to publish the results of its investigations; the second class has power to make orders and to replace the judgment of companies as to rates, service, accounts, capitalization and other matters by its own judgment formulated under definite rules laid down by the Legislature. The Legislature says that rates shall be reasonable and authorizes the Commission to examine into the facts of a particular case and to determine what constitutes reasonableness under the circumstances of that case. And having determined what constitutes reasonableness under the circumstances of that case, the Commission announces its determination and its conclusion becomes effective by operation of law to supersede the prior determination of the company itself.

## Public and Private Business

The foundation for regulation of public utilities is the distinction established in our domestic or private law between public and private business. The distinction is one of long standing, and one which is no longer susceptible of question in the courts, and I take it, in the common judgment of the people.

Public business is in one class and private business is in the other class.

Briefly stated, the elements which make for a public business as opposed to a private business are, first, the furnishing of a service, second, a public need or necessity for the service, third, the possibility, if not the existence, of monopoly. These are the three factors as generally understood. They are the ones generally stated by the courts. First, the furnishing of a service as opposed to the sale of a commodity; second, public need or necessity; and, third, monopoly.

## Meaning of Public Calling

The doctrines of a public calling were developed originally in the case of common carriers—not common carriers by rail, because the doctrine antedates the railroad by centuries, but common carriers on the ordinary highways. As soon as the other public utility industries came into existence and came to be closely identified with the public interest, the doctrine of the public calling was applied to them. It is necessary to remember this distinction between a public business and a private business; the distinction is fundamental and any reasoning which does not concede the distinction is likely to be fallacious in its outcome. I shall give you a little instance just as an example: you want to send a trunk from your house to the railroad station; you go around the corner to the shop of a man who is engaging in the expressing business, and who has a sign out on his door to the effect that he is doing a public expressing business. You say to him, "Come around to my house, get my trunk and take it down to the station." He starts off and on the way, we will say, his horse and wagon are run into, through no carelessness of his own, by a recklessly driven automobile, and the trunk is damaged. I take it that in the absence of any stipulation to the contrary, the expressman is liable to you for the damage sustained in the injury to your trunk. Take another case. You go around the corner to the man who is running a feed store and who has a horse and wagon; he is not very busy and you ask him as an accommodation to you to carry your trunk to the station. He takes your trunk, starts off, and in turn is run into by the same automobile driven by the same reckless driver, and the trunk is damaged. You have no recourse against this individual for the loss which you have sustained. He has been guilty of no negligence; he has exercised due and reasonable care in handling your trunk.

Now, why is it that one man should be liable and in an exactly similar case, the other man is not? Simply because one is engaged in a public business and the other in a private business. Set the two side by side, and you cannot see any reason why one should be subject to any greater liability than the other, but the law and the policy of the Anglo-Saxon people has established a different liability for the one than for the other. And so when you see the State assuming to regulate the rates of an electric company, of a street railway company, of a water or gas company, although it does not regulate the rates of a mercantile industry, or of a dry goods or candy store, or of a manufacturing establishment, you will know that underlying the difference in treatment is a distinction between the kinds of business in which the two classes are engaged. That distinction, I say, is a fundamental one and must be kept in mind.

Now, a word at this point on an idea which is coming to be expressed quite frequently on the platform and in the writings on the subject of public utility regulation. It is said that the public utility is an agent of the public, that the public is principal and that the utility is its agent; and that the ordinary rules of conduct applicable to principals and agents must apply to the public and public utilities. And that doctrine has been developed apparently primarily for the purpose of influencing the disposition of the subject of valuation of public utility properties in rate cases. It is designed apparently to give to the public the benefit of such items of valuation as unearned increment from land, profits accruing to the utility in addition to what may be considered the fair profits of the business and other items of the same kind, the general underlying theory being to hold the public utility to the strictest possible accountability.

This theory was expressed in a recent address by Professor John H. Gray, of the University of Minnesota, now President of the American Economic Association, in an address on the subject of Valuation before the American Economic Association at its last annual meeting. Professor Gray said:

"Here we have the fundamental and basic doctrine of principal and agent. I shall attempt to show that the moment we depart an iota from this doctrine we are lost, for in such departure we pass at once from the realm of fact into the region of fiction."

Principal and agent! Now it is true that there is a fundamental distinction between private business and public business, but it is important to inquire from the standpoint of future regulation of public utilities whether the distinction is such a one as to make of the public utility an agent, according to the ordinary meaning of the term "agent," of the public. And I wish to throw out this suggestion: The doctrine of principal and agent fails at the point of fixing responsibility for the supplying of initiative. Ordinarily the principal conceives and the agent executes. The doctrine of principal and agent has not a complete analogy in the arrangement between the public and the company, and will not have until the public in a large sense is capable of initiating, and does initiate. This point of view is suggested by Taussig, when he says, in his Principles of Economics*: "To sum up: the strictly economic earmarks for state-managed industries are maturity and monopoly." "The maintenance of progress in the arts is another difficult matter under public management."

I quote again from Taussig:†

"The German Empire and the German states, in their post office, telegraph and telephone, perhaps in their railways, unmistakably in their military organization, have maintained a high spirit of ambition and emulation. But the Australian colonies seem to have secured simply humdrum management; honest, to be sure (and for this much we in the United States, to our shame, must pay our tribute of respect), but void of life and vigor. No democratic community, with the possible exception of Switzerland, has shown in its public industry a spirit of progress comparable to that of private industry."

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*Vol. II, pp. 407, 408.
†Vol. II, p. 409.

In the consideration of this principal and agent theory it is necessary to remember that the supposed principal in this case has not in the past supplied the initiative. There is nothing to indicate today that the principal is prepared to supply the initiative. It may be then that if the doctrine is weak at one point it is weak at all points. We may be obliged to resort again to the general principle that in the adjustments of relations between the two, equity must be done. Reason must be brought to bear, the balance must be made perfect, according to the requirements of each individual case, and not on the basis of any such made-to-order theory as this.

### Commissions Enforce Ancient Duties

In a recent lecture in this course before the Finance Forum, the duties of those engaged in public callings was outlined. I will refer to them briefly. Those engaged in public callings are required as a part of their lawful duty to furnish service at just and reasonable rates, and to have their service adequate and safe. These principles are at the foundation of our regulation of public utilities. Just and reasonable rates, and adequate and safe service! Regulation as we know it in its essence is simply an effort to give life, to give vigor, to give application to these rules, to these laws of conduct which apply to public business. Our system of law enforcement broke down at the point of giving vitality to these rules in the case of businesses which have a tendency to monopoly and deal with public necessities, and our commissions today fundamentally and in the last analysis are nothing more nor less than an effort to give effect to this doctrine: Reasonable and just rates, adequate and safe service.

### Commissions Are Regulations of Profits

In the case of what is called private business, business which is not touched with monopoly, competition is a regulator, and it may be said probably that to the extent that competition fails to act as a regulator, these businesses tend to go over into the class of public businesses. You may have noticed that a week or two ago the Supreme Court of the United States sustained a statute enacted by a Western Legislature which was based on the idea of applying this public calling, or public business, doctrine to the insurance business. This is an indication of what may be in store for us; this is certainly, from all appearances, a radical departure from what has been considered the limits of public businesses. It was the absence of competition in the making of insurance rates that seemed largely to influence the court in this case.

Briefly I wish to present to you on the subject of the ultimate function of regulation the views of Professor Taussig, who is one of the foremost economists of the country, and of Mr. Robert H. Whitten, Statistician and Librarian of the Public Service Commission of this city. Professor Taussig's ideas are incorporated in a discourse on business profits. As your Chairman stated at the beginning of this meeting, the question of profits is a vital one in the field of public utility regulation. Profits must be protected, but is there to be no limit to profits? What limit is there to be to profits? Taussig says:*

"The restriction of business profits within 'legitimate' bounds depends on two things: on the one hand, full and free competition; on the other hand, the maintenance of competition on a high plane."

In the utility businesses we do not have full and free competition. We have learned that competition is not desirable, that it is uneconomical, that it is wasteful, and that it is to be discouraged; and we find public utilities in a class by themselves largely because of the fact that monopoly is the predominating influence in them.

"First, freedom of competition. Monopoly profits are not 'illegitimate' in the sense in which are those which result from sharp practise and cheating; but they are 'illegitimate' in being greater than necessary to induce the exercise of the full productive faculties. Setting aside such cases as patents and copyrights, they mean that the public pays more than there is any need of paying. Shrewd understanding of the possibilities of monopoly, skilful management of monopoly industries, have been great sources of business men's incomes and fortunes; and this without violation of law or of the properties of business life. The regulation of monopoly industries is among the most urgent of social problems, and essential for keeping business profits within the limits of the reasonable or legitimate."

## Regulation Applies Normal Cost

Very much to the same effect, but couched in different language, and approached from a somewhat different standpoint, is the treatment of Mr. Whitten in a paper entitled "Distinction Between Value for Tax and Rate Purposes."† Mr. Whitten says:

"If a commodity may be freely produced, but only by specially trained workmen, a large fixed investment, and great business risks, the cost of production will still in the long run *tend* to limit market price. It is clear that the production of a particular commodity will not be permanently carried on unless the price received covers all the costs of production. Under free competition it is also clear that a price higher than that necessary to cover special risks, interest, profits and operating expenses will bring new capital into the industry and thus bring the price down to the cost of production. For a freely produced commodity, therefore, a price or market value that does not conform to cost of production is not a stable or normal price or value. In a static society with many actual limitations upon perfect freedom of competition market value and cost of production are often very far apart. Economists have used the term normal value to indicate in the case of a freely produced commodity that value that corresponds to cost of production. It is the normal value because it is the value toward which market values tend; it is the value that under assumed conditions would be stable.

"The above presupposes competitive conditions. In the case of unregulated monopoly the force that tends to limit prices charged to the cost of production is entirely lacking. This creates the necessity for public regulation of the rates of charge of public service companies. The aim of public regulation is to accomplish what in other industries is assumed to be accomplished automatically by free competition, that is to limit the price charged to the actual cost of production. In the case of authorized and regulated monopoly, ordinarily the reasonable rate of charge will correspond exactly to the economist's conception of normal value. The reasonable rate is ordinarily the one fixed by the normal cost of production. It is fixed by normal operating expenses plus a normal rate of return on a normal capital cost. Cost is ordinarily the determining factor in fixing fair, reasonable or normal prices in the case of a regulated monopoly."

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*Principles of Economics, Vol. II, p. 189.

†A paper read before the National Tax Association, Oct. 23, 1913.

So, we take from Taussig the theory that regulation is necessary to keep profits within the limits of the reasonable or the legitimate. We take from Whitten the theorem that regulation is necessary to keep prices near the normal, or to what they would be if they were determined by the normal cost of production; and we may say perhaps that the ultimate function of regulation is to accomplish these two purposes.

## Public Ownership the Greatest Monopoly

We have said something about monopoly. Let me call your attention to the biggest monopoly that it is possible for us to have in the field of public utility businesses. Unregulated monopoly we are all of us prone to condemn as obnoxious; it is insufferable; but in the case of publicly owned utilities, publicly owned facilities for the supply of the numerous services which are classified under the term of public services, is unregulated monopoly in its highest form. We have it in the Post Office and in the Parcels Post service; foreign people have it extensively in many of the public services.

Our own experience and that of our neighbors abroad seems to indicate that this is a monopoly which through the unwieldiness of the entire system of government in the majority of cases is slow to respond to the needs of the people served and far less well adapted to the convenience, comfort and welfare of the public than private regulated monopoly. Public ownership in whatever form you may find it is likely to be, and in most cases is, unregulated monopoly; in anything but a mature and stable industry, at least, it is dangerous for that very reason. It lacks, as most forms of public enterprises lack, the initiative which has characterized the public utility industries in the past and which gives every promise of characterizing them in the future if the public utilities are allowed to continue to exist in private hands.

## Future Possibilities of Services

Having considered the nature and functions of the regulation of public utilities we may now turn our attention to the economics of public utility services. By this we intend to comprehend generally the practical problems of furnishing service in accordance with the needs and requirements of the public. In this connection it is of fundamental importance to have an adequate conception of the possible future of the industries and of their capacity in the future to a greater extent than in the present to contribute to the comfort, convenience and welfare of the public.

## Transportation Service of Future

Let us consider the services themselves, starting with transportation! Are we at a point where we may say that the transportation services have reached their final development? The answer must be, No! In our urban transportation facilities we are very far from perfection. Even the generous provision made in this city is not adequate to fill the rapidly increasing demands. What the developments of urban rapid transit facilities will be perhaps transportation experts know pretty definitely, but it is sufficient for our purposes that conditions such as exist in New York and other large cities today probably will not be tolerated for a great many years. I say this without intending to detract any credit from our transportation systems. The cities have grown more rapidly than the transportation systems and our ideas of transportation. And what our ideas of transportation are today is no criterion of what they will be twenty-five years from now.

Take our streets and country roads! There is no more important public utility in the land than streets and highways. Look about you and see what we have in New York and in our other large cities! We have witnessed in the last few years the development of a highly efficient means of transportation in the automobile. The automobile will require in years to come far better facilities for use than it has at the present time. A stroll up Fifth Avenue, or better a ride up Fifth Avenue, in the middle of the afternoon or towards the latter part of the afternoon, will convince one that with respect to the facilities which are afforded for automobile traffic we are in the Dark Ages. What we are going to have, who knows? It is very reasonable to expect that we will develop a system whereby there will be speedways through our large cities for long distance automobile traffic, and other ways paralleling them for short distance traffic; but ways so arranged that traffic at crossings will not be interrupted and automobiles may proceed without interruption.

Then there is the country road! I believe that the railroads charge on the average about seven-tenths of a cent per ton mile for the transportation of freight. It costs on the average twenty-five cents per ton mile to carry goods over country roads. The country road is a facility which is absolutely essential to the life of every one of us, because our food products are obliged to be started on their journeys to centers of consumption over the country roads. And I presume there is no place where greater constructive ability and greater enterprise is required from a national standpoint and from a large public standpoint touching the public utility field than the country roads. It might be pertinent to suggest that much of the activity which is directed to hammering down the seven-tenths of a cent per ton mile for the railroads could better be directed to hammering down the twenty-five cents for the country roads.

## Future of Gas and Electricity

Let us examine briefly the electric and the gas services! Up to a comparatively recent time these services have been considered competitive. But it seems very clear now that we must revise our standards. In the light of present developments they are not competitive services, but complementary services. Each seems to have a function to perform, and the function of the one is different from the function of the other. What this may mean in the future development of the gas and electrical industries cannot be foretold. The probabilities are that in time to come our cities at any rate will be supplied in entirety with respect to light, heat and power, from large central stations. Perhaps there will be individual stations for gas and electricity, respectively; perhaps single stations will be developed to use the same fuel for the generation of electricity and the production of gas. There are possibilities in such a development which are tremendous.

I don't know that there is a great deal to be said about water. The consumption of water per capita seems to have increased very largely in the last few years and it is quite likely that it will continue to increase at as rapid a rate or perhaps a more rapid rate in time to come. Doubtless our standards of water service will undergo radical changes as time passes.

The telephone is the infant prodigy. We, in this country, have developed a telephone system, the like of which exists nowhere else in the world; but I do not suppose that the telephone people themselves would hazard a statement that they can see the end, whether the end be measured in the actual number of telephones in use or the relative number per capita. I presume it is possible and not unreasonable to conceive of a time when every building, every residence, every building of any character, will be equipped with telephones; and we may see the time when every room in our houses will be equipped with telephones. The telephone is such a labor-saving and time-saving device that it would seem that the largest possible spread of its use is desirable for the convenience and comfort and welfare of the public.

## Other Service Industries

The sewerage service, of course, is a big public utility. Heating? Well, heating probably is a function of the gas service and requires no more attention. Refrigeration? Have you ever thought of the possibilities of the refrigeration service? We have a little of it performed now by public utility companies. It is rather significant to note that the public utility laws in some of the southwestern states, where refrigeration probably is a more important factor in the comforts of life than it is in this locality, specifically designated companies for the providing of cold or refrigeration as public utilities. I see no reason why refrigeration service should not be supplied to all of our homes and places of business in exactly the same manner as the heating service and the lighting service is supplied. Much use might be made of a vacuum service. One of the recent authors on the subject has mentioned the supply of disinfecting gas. And so the list might be extended.

I am indebted to my friend, Mr. R. P. Bolton, for a summary of the future of public services for the supply of energy, which I shall take your time to read.

"It seems probable that as time proceeds, and the density of occupation of cities becomes greater, general convenience will be served, and economy of materials be effected by a more extended use, even than at present, of public distributions of energy in various forms. Practically the whole of the conveniences of domestic and business existence can be provided by such means, but at the present time in most communities only partial provision is made for the full conveniences possible. Thus, the Borough of Manhattan possesses only a very limited extension of steam piping in the streets, and does not have any high-pressure water such as is available in London.

"All public conveniences are a result of the development of the art of the manufacture of piping.* From the first distribution of water by the Manhattan Company in 1822, this necessity was fundamental, and was met by those pioneers by the construction of bored wooden logs, the joints being made by tapering the ends so as to fit together, when the swelling of the wood made a joint. Some of this piping is still in existence, and appears to be far from entirely decayed.

"From this point the introduction of gas proceeded with the process of pipe manufacture by metal, which at first was made by using old gun barrels, and led to the enormous industry of pipe manufacture which now exists.

"The entire range of such services would comprise electricity, steam, gas, perhaps both low and high pressure, water, both low and high pressure, and possibly compressed air, each of which is in practical existence in certain communities, but no one possessing all of them at the present time.

"The value to the community of thus combining their needs in such undertakings, is far-reaching. The principles of conservation are to be met by such combination, since it is evident that the services of a large number can at all times be provided with a less expenditure upon materials and labor, than by the breaking up of products into a large number of small units.

"A striking illustration of this ineffective method is afforded in the very recent report of the special committee of the London County Council on electrical distribution in that city.

"By reason of the numerous experiments in municipal operation, a multiplication of inadequate central stations and distributing systems has been constructed, there being no less than forty-nine such systems, these having seventy generating stations. This report recommends that practically the whole of the investment in these stations, which amounts to forty millions of dollars, should be abandoned, and a new investment of about thirty-five million dollars made in concentrated and improved central stations.

"The same principle which has thus become evident in London will be found to be applicable to every community, and every attempt which is made to duplicate systems in the manner which has been done in the

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*Note.—This is an interesting point of view. I don't imagine that Mr. Bolton had in mind the transportation service when he wrote this, but in the final analysis it will apply to the transportation services. The copper wire or the third rail is nothing but a pipe in another form.

Province of Ontario represents an economic waste, and must eventually lead to the maintenance of higher costs than would be the case under more concentrated conditions of operation."

### Future Improvements Judged by Past

This program of the development of the public utility industries may sound elaborate; it may sound visionary. Let me call your attention to expressions current in the early days of the railroad industry. What I wish to emphasize particularly is the contrast between the conservative estimates of those who were particularly interested in the new means of transportation and the somewhat caustic and satirical comments of those who might be said to believe that a state of perfection in transportation then existed. *The American Railroad Journal* was started in 1832; its first number was published on the 2nd of January. The editor, in addressing the public formally, made this very modest statement:

"The importance of some other mode of internal communication in this country, where the canals and rivers are for about one-third of the year closed by frost, renders it highly desirable that a fair experiment should be made of the utility of railroads." Certainly modest enough!

In the next issue of the same magazine a report of the Baltimore & Ohio Railroad corporation was presented, and this comment appeared:

"It would seem, from experiments already made on this road, that there is no reason to doubt that the travel on it may be safely carried on at the rate of from twelve to fifteen miles an hour, by the aid of steam power, and that passengers may be carried from Baltimore to the Ohio River within from twenty-four to thirty hours, at all seasons of the year—a distance little short, we believe, of 350 miles!!!" And there are three exclamation marks following that statement!

The Governor of the State of New York in his annual message to the Legislature of that year said:

"They (meaning the railroads) are not so well adapted to general use, as either roads or canals, because they will admit upon their track none but public vehicles of a peculiar construction."

Bear this judgment in mind when you listen to and read objections to new developments and innovations in the fields of the public services.

Here is the contrast. It is called attention to by the Editor of *The American Railroad Journal*, in the third number of his periodical, which appeared on January 14, 1832. He said:

"And first, as to the title of this periodical, we have been not a little amused at the comments it has excited. '*The Railroad Journal!*' 'Phoebus what a name!' 'I should as soon think!' cried a gentleman in our hearing, 'of a Patent-Furnace or Cooking-Stove-Journal.' A newspaper devoted to Railroads? You might as well have an 'Aqueduct Chronicle,' or a 'Turnpike Commentator,' as a 'Railroad Journal!' 'Certainly,' echoes another, and 'The Steamboat-Aegis,' or 'The Steam-Bath-Locomotive,' or 'The Steam-Scouring Visitor,' would be far more attractive titles!"

You will be interested in noting the comment of the New York press on the opening of the original electric generating station in New York

City. It was the *Herald* and it appeared in the morning issue after the opening of the station on September 4, 1882. It read: "Last night it was fairly demonstrated that the Edison light had a very fair degree of success."

It is well to keep in mind that progress in the last few years has been rapid and that there is no reason to believe that the progress of the future will not be even more rapid. This progress, if healthy, will promote the convenience, comfort and welfare of the public. The effect of the regulation of public utilities on this progress is of the utmost importance to the public.

### Public Service Economics

We can do no more than touch some of the high spots of public service economics. You have seen that we may expect in the future a city which may be characterized as "a city of pipes and wires." All of our public services will be furnished us, will be brought to us, by the means of pipes and wires. I would not be surprised if the time comes when a chimney in a house or a building will be entirely obsolete, when people will refuse to put chimneys in new buildings because of the space they occupy and waste, and when chimneys will be taken out of old buildings. There is no reason why all the mechanical energy consumed in our buildings should not be supplied from outside, and supplied better than we are able to supply it ourselves, and more economically.

This is real conservation; this is a line along which probably as large results in conservation can be secured as any other.

Now, what does this mean? It means in the first place that a large amount of capital is to be required. You cannot construct a conduit in the streets, you cannot lay copper wire in conduits, you cannot lay gas mains, water mains, pipes of other kinds, in the streets, without an expenditure of large sums of money. You had the privilege of listening some weeks ago to an address by Mr. Samuel Insull, of Chicago, on the subject of the centralization of electrical energy; and I am sure you were impressed by the large part which capital plays in the industry. I am sure you were impressed by the large field of activity which remains open in utilizing the capital employed in the electric business to its fullest possible extent.

### Infrequent Turn-over of Capital

We have a condition today in all of the public utility industries where capital turns itself over only in from four to six years. This is a condition which exists probably in no other line of business. It is one which could not exist in or which does not exist in very many private businesses, and one which is of vital importance in the consideration of the future of public utility regulation. Capital must be provided and capital must be paid for. And the turning over of the capital is so infrequent that the charge on the consumer, or on the actual output, to take care of the capital is proportionately large.

Economy in the important public utility industries probably means more than anything else, obtaining a larger average use of the capital employed. Instead of using the capital an average of three hours a day or four hours a day, bring about its use five, six or seven hours a day; and very few people are courageous enough to predict a time when the capital in such a business as the electric will be used on an average more than six, seven or eight hours a day. The rest of the day it stands idle. Any means that can be devised to keep that capital active during a greater portion of the day must necessarily result in lower production costs, and the greater comfort, convenience and welfare of the public. This capital must be procured and, as your Chairman has well stated, regulation must not prevent the securing of the capital. It does not make any difference who owns the public utility; it is the same if this group of men, or that group of men, or the third group of men, owns the plant and is providing the capital. The capital must be secured, and the man who owns capital, the people who own capital, must be induced to loan their resources to the industry. And capital must be paid for.

There is a kind of indirect payment for capital which frequently is lost sight of. When capital, when money, when dollars are converted into pipes, wire, electric generators, telephone apparatus, street cars and apparatus of other kinds, it tends to waste and to reach a point where it no longer can be used. It is consumed, it passes away, so far as its usefulness is concerned, and it becomes necessary to offset or provide against that waste, otherwise a time will come when there will be no service, for the very reason that there are no facilities to furnish it.

## Great Importance of Depreciation

And so we find it necessary in the public utility businesses, as in all businesses, to make some provision for what we call depreciation. The significant thing, however, is that depreciation is a more important item in the public utility industries because fixed capital plays such an important part in the final cost of the services.

We have witnessed in the last few years the operation of the tendency which is known as obsolescence, and the necessity to supersede property before it has reached the end of its normal life. Mr. Insull probably told you that it was necessary in his plant in Chicago to supersede a new generating station almost before it was completed. The developments in the art have been so rapid that by the time the new and most modern and up-to-date generating station was completed, newer and more economical devices and apparatus, made it necessary to discard the new station. The expense of keeping pace with the progress of the art must be borne by the service. It is a part of the cost of keeping capital intact.

The need of procuring capital and the need of securing the largest possible use of the capital when it is secured suggests the necessity of profit. Profit is an important item in the public utility business and it is one which ordinarily is measured largely in terms of capital outlay. The men who bring the capital together, the men who put the capital to the most economical, most efficient and most productive use, are entitled to demand and must receive adequate compensation for their services.

Regulation which denies the promoters of public utility interests a return commensurate with their labors and commensurate with the risks involved in the industries, will put a stop to the conduct of utilities on this basis.

## Capital Cost in Wisconsin

On the subject of the cost of capital I wish to call your attention to a few figures which have come to my hand recently on capital charges in a number of plants in the State of Wisconsin. These figures are compiled from reports of the Railroad Commission of Wisconsin. The first I will read to you are taken from thirteen companies and represent the cost of plant and property per kilowatt of maximum station demand. The average of the group of thirteen properties was $510 per kilowatt. A kilowatt, as you doubtless know, is about a third more than a horsepower. The fixed charges on that amount computed at 10%, 15% and 20%, would be as follows: $51, $76 and $102. Taking the percentage of fifteen, we may say that it represents, roughly, six per cent. for depreciation, eight per cent. for a return, including interest and profit on the investment, and one per cent. for taxes, which must be met in the case of these properties.

I mention these items simply to give you an idea of what is embraced in the term "fixed charges." One is at liberty to exercise his own judgment as to what should be allowed for each one of the items of depreciation, return and taxes. If your aggregate of the three items runs as high as 20%, you require a return of $102 for each kilowatt of maximum demand on your station. If it is 15%, the fixed charges will require $76.

Take the investment, now, from the standpoint of the facilities which the consumer has connected to the system! Take it from the standpoint of what is called the connected load! The average for fifteen plants is $197, practically $200, per kilowatt of connected load. An average six-room apartment probably would have a connected load, of, we will say, from three-quarters to one kilowatt in lighting, and that might be taken as an average basis on which to compute the result.

Taking the same percentages for fixed charges, we find that allowing only 10%—and it must be manifest to you that 10% is abnormally small and in disproportion to the needs of the case—the requirement is $20 per year. If the consumer had three-quarters of a kilowatt installed, it is obvious that on that basis it would be necessary for him to pay $15 a year in order to take care of his proportion of the fixed charges. Figuring on the basis of 15%, the amount would be $30 a year, of which three-quarters would be about $23. Figuring on the basis of 20%, the fixed charges would be in the neighborhood of $40, and the proportionate part for three-quarters of a kilowatt would be about $30.

Turn now to the figures for the kilowatt hours generated! What the consumer buys is the kilowatt hour. The kilowatt hour is the unit of sales. The kilowatt hour represents the utility which the consumer derives from the service. We find that the average property and plant investment for fifteen plants was about 22 cents per kilowatt hour. Fixed charges of 10% amount to 2 2-10 cents per kilowatt hour, which is larger than any other single factor in the cost of electrical service on the average. And 10% for fixed charges is a very low figure itself. Fifteen per cent.

yields an average fixed charge per kilowatt hour of 3 3-10 cents; 20% yields an average of 4 4-10 cents per kilowatt hour for fixed charges.

## Analysis of Costs

You frequently hear it said that electricity can be produced for one cent per kilowatt hour, or for less than a cent per kilowatt hour. In fact, in modern stations, what is known as the cost at the switchboard, runs down sometimes to less than half a cent per kilowatt hour. But that is direct operating expense, and takes into consideration no item of fixed charges. I recently had occasion to examine a case in which the entire cost of placing power on the switchboard was about a cent per kilowatt hour. But these figures ignore the fixed and operating charges on the distribution system, which is a very large portion of the plant, and other charges. So figures of this kind must be scrutinized carefully, or they will lead to erroneous conclusions.

It is necessary to keep in mind in considering the subject of regulation of public utilities, the distinct factors which enter into the cost of service. What we have said about fixed charges suggests naturally the factor which is dependent not upon use but upon ability to consume; or, taking it from the standpoint of the company, readiness to serve. Another distinct factor in the cost of the utility services, is the output, or the direct cost of operating the plant and putting the service at the disposal of the consumer. Most rate experts find a third class, or a third factor, entering into the subject, which is denominated usually the consumer factor, and embraces a class of costs which depends upon the number of consumers rather than on the amount of service rendered or on readiness to serve. The existence of these cost factors suggest the necessity of charges which will enable the company, or the agency supplying the service, to recoup itself for the services rendered; and accordingly we find schedules of charges based on these factors.

Now, you can, if you will, depart entirely from these cost factors, and efforts are made in some localities to disregard them entirely in the making of rates. In many localities there is a strong public demand for rates which are built on the sentimental idea that the unit price which each consumer pays shall be the same. The history of the public utility industries is strong and potent evidence of the fact that regard must be paid to the cost factors, as they may be called, rather than to the sentiment of the consumers. The Public Service Commissions throughout the country are frequently required to answer the petition of consumers for rates which are uniform for all consumers, regardless of the incidence of the cost factors; and in your consideration of the determination of the Commissions in these matters, you should keep in mind at all times the analysis which I have barely outlined to you.

## Charging What Service Will Bear

Just a word at this point about the term "charging what the service will bear." The railroads frequently have been criticised because they charged what the service would bear. The same complaint is made of other utility companies.

What is meant by the term "charging what the service will bear"? It has two meanings, or it may be used in two ways: it may mean charging what monopoly power will enable one to charge, or it may mean charging what the exact requirements of the consuming public will enable them to charge. Charging what the service will bear, on the basis of monopoly power, is improper and indefensable; it is strongly to be combated. Charging what the service will bear on the basis of the joint cost theory has been responsible for the development of the railroad industry and of all of the public utility industries to a very large extent. An examination of rate schedules, and particularly of the computations of Public Service Commissions, reveals the fact that a compromise is effected usually between cost of service, or the division of the costs on the basis of the cost factors, and what the service will bear. The term is one which has been used to condemn public utilities and public utility practices, but you must always remember when the term is used, that it is capable of being used in two ways, one undoubtedly bad, the other unquestionably good.

## The Future of Regulation

What now may be said about the future of public utility regulation? We have examined the nature and functions of regulation and the economics of public utility operation at the point of most immediate contact with the public. It must be obvious that the future of regulation will depend in large measure on the extent to which both subjects are kept in mind and allowed to develop the conduct of commissions as the days and weeks go by. A number of factors contribute to complicate the future. We shall attempt very briefly to examine these factors and to indicate what in our opinion is desirable from the standpoint of public utility regulation.

The first factor for us to consider is the attitude which the companies themselves to be regulated display toward regulation. The companies must meet regulation fairly; to use a popular expression, they must meet the Commissions with their cards on the table face up. In no other way can regulation justify itself; in no other way can regulation accomplish the ends which are expected of it. And we are fortunate to be able to say that in the majority of cases the companies of this country, all over the country, are meeting the commissions fairly and in the spirit of working out problems, admitted problems, known to exist, in a fair, open and honest manner, conducive to the comfort, convenience and welfare of the public. That is one factor.

The next factor—perhaps it should have been the first—is the education of the public. The public must know what it is dealing with in these matters, and the public must bring its knowledge to bear in a way which will produce results through the bodies which are established for the purpose. The intelligence of the public must be represented in the first place in the legislative enactment of laws. The laws must be drafted in such a way as to leave no question about the authority which is conferred upon the commissions, and give the commissions the opportunity to discharge their proper functions. The intelligence of the public must be developed to the point where men of the right character, men of the right standing, will find it attractive to serve on the public utility commissions. These laws, of course, will not regulate themselves. As I have already intimated, these laws are nothing more nor less than the statement by the Legislatures of rules which have existed for many years. The innovation in public utility regulation is the establishment of a means of enforcement, not the establishment of duties to enforce; and we must have men of high character, men of great ability, men of force, men of aggressiveness, men of determination, to make certain that these laws of common acceptance are applied rigorously and without favor either for the public or for the utilities. There is just as much danger in stretching the point in favor of the public as in stretching the point in favor of the utilities. The only way in which true progress can be made is by keeping a perfect balance, and to accomplish that result requires men of high character and determination.

The education of the public must be such as to lead the public to listen to the bodies which are constituted by it for the regulation of public utilities, to forebear in their conclusions and to wait a reasonable time for the outcome of projects which have the sanction of their official representatives in the commissions.

In this connection I wish to call your attention to an incident which occurred to me a short time ago. An attack on one of our important public service commissions has recently emanated from an organization whose avowed purpose is to destroy the system of public service regulation as we now have it, through the agency of State Commissions. I took occasion to call the attention of one of the acting spirits in this movement to the fact that this attack failed to consider one or two items which certainly are of great importance in considering the relations between the public and public utilities. I mentioned specifically the cost of electric service and stated that apparently if his organization were advised of certain facts relating to the cost of electric service, they would be willing to modify their characterization of the system of regulation which was attacked. The reply I received was as follows:

"In the matter of cost of electric service—we have not cared to go into that in detail, not regarding it as essential to our purpose. Cost of electric service is an expert proposition. It was not a subject that we could go into in detail even if we cared to."

We do not care anything about cost! We are going to have the kind of regulation we want; we are going to have the rates, we are going to have the service, we are going to have the whole arrangement to suit our taste, without any reference to the cost of it! It must be manifest that such an attitude if carried to its extreme will be destructive of the public utility industries, and of every effort that may be made to continue the development of the industries along the lines which we have indicated this evening. The public must be willing to consider all of the factors which enter into the situation, and as I said, to rely on the judgment of its regularly organized representatives. Such willingness presupposes a fair degree of education in public service economics.

The Commissions must be supplied with facilities to enable them to carry out their functions. They must have experts, they must have staffs of various kinds, they must be provided with funds to enable them to cope with any situation which may come up. These investigations are expensive and the State cannot expect to regulate public utilities in accordance with the requirements of modern day problems, without spending large amounts of money. But measuring the amount of money spent against the investment in the business and against the income from the business, it is not large.

Another important factor is intimate knowledge of the rulings of commissions. We require in the field of commission regulation a reporting system such as we have for the courts. No such thing is in existence at the present time, but the public at large and those who are interested in the matter of commission rulings and commission activities must have a means at hand to know what all of the commissions are doing, so that principles as they are developing in the minds of the various commissions over the country can be brought together and compared, and doctrines, salutary doctrines, for the future, can be developed.

## Public Ownership Not Desirable

The alternative to the regulation of privately owned public utilities is public ownership. The truth of this conclusion is obvious. Public ownership is the subject of one of the addresses that have been delivered in this course. Other speakers have touched on the subject at greater or less length. I shall content myself with the suggestion that the controlling factor in the present day consideration of public ownership is the relative efficiency and aggressiveness of publicly conducted as opposed to privately conducted industry.

Past experience seems to indicate without question that private industry is more enterprising and more rapid in its development than public industry. The organization of private industry and the methods by which private industry is conducted are more conducive to efficient and economical results than public industry. There may be individual cases which seem to disprove this general tendency, but, on the whole, I think that the experience of the past will afford ample justification for this characterization of public industry.

We have reached the point in our social and economic development where we are agreed that the important public utility industries are monopolistic. By the elimination of competition we have lost what has long been regarded as the natural regulator of profits and of prices. Regulation by commission we have seen is the modern substitute of society for competition in restraining profits within reasonable limits and in holding prices close to the line of normal production costs. If regulation is successful in accomplishing its purposes there would seem to be no occasion for public ownership. On the other hand, if regulation does not fulfill its purpose adequately there is strong reason to believe that the public will conclude it desirable itself to take over and operate these industries. From the standpoint of the public comfort, convenience and welfare it would seem that a movement towards public ownership of these industries should be deplored in the extreme, but in all fairness it must be conceded that if the public does not succeed through the means of private agencies subjected to regulation in obtaining adequate and safe service at reasonable rates it will be justified in undertaking on a more extensive scale than we have witnessed in the past the experiment of public ownership.

The chief objection to public ownership from a broad standpoint is the probable retarding of growth. As we have already seen there is strong reason to believe that the important public utility industries have not reached a period of full maturity. Accepted standards of the present day probably do not represent the maximum social benefits which the industries are capable of yielding. Until a radical change has been effected in the organization of national, state and city governments there is strong reason to believe that private industry operating in these fields will be more successful in attracting and developing far-sighted genius and enterprise. The public incidentally might well afford to pay a slightly enhanced price for the services in order that such developments may be encouraged.

## Conclusions

We have examined the meaning of the term regulation and the practical functions of regulation. We have considered very briefly some of the economic laws subject to which public utility industries are conducted. We have surveyed the present and possible future status of the industries in the life of the community. It is imperative that these various factors be kept permanently in mind in considering the future of public utility regulation and the relation between regulation and public ownership. Regulation will thrive or decline according to the treatment which it is given by the utilities and by the public. To the extent to which such treatment is influenced by one of these factors to the exclusion of others regulation is likely to decline. Regulation is a problem of statesmanship rather than of opportunism. Statesmanship will consider and give proper weight to all of the factors; opportunism will be guided by one of the factors to the exclusion of all others.

The future of public utility regulation is the future of democracy. We in this country are in the midst of the greatest experiment in democracy that ever has been attempted. I for one am sanguine of the result. The American people are wide-visioned enough, intelligent enough and sympathetic enough to solve the problem of democracy. But they will solve it themselves; the solution will come not from without but from within the ranks. So with the regulation of public utilities. It is a system which is in its infancy. It is designed to promote the comfort, convenience and welfare of the public. As an instrument for the furthering of such a high purpose it is an experiment but an experiment which there is every reason to believe will prove successful. The problems are complex and difficult but no more so than many others. We hope and believe that regulation will continue increasingly to merit the confidence which is imposed on it and that before the lapse of many years the wisdom of the American people in developing this new type of governmental agency will have been demonstrated beyond doubt.

# Some Legal Aspects of Regulations of Public Service Corporations

### By Charles F. Mathewson

## Aim of Regulation is Efficient Service

The subject of regulation of public service corporations has long received, and at present is receiving, much attention and thought. The principles underlying it have been a matter of discussion, and to a large extent of legislation, in the councils of both the national and the state governments; and the method and extent of the application of such principles, is not only of importance to the corporations concerned, but is equally important to the customers whom they serve. The most essential consideration to customers is efficiency of service; and any mistaken theory, or imposition, which compels a public service corporation to sacrifice efficiency to lower rates, is, and will sooner or later be recognized to be, a greater misfortune to the public than to the corporation.

It must not be supposed, however, from the title of this paper, that public service corporations and undertakings are alone subject to public regulation. On the contrary every corporation, and every business, may be and many of them now are under regulation by the legislature or by municipalities or other political subdivisions to which has been delegated a portion of the legislative power. The extent and nature of such regulation in any case, depends largely upon the character of the business and the manner in which it touches the public. Thus a corporation whose business has a natural tendency to produce annoying sounds or noxious fumes, or which employs processes hazardous to the health or safety of its employees, can be supervised and regulated in directions and to an extent which would not be appropriate or even legal in the case of another business equally private in its character but not possessing those attributes.

This right of regulation, both as to public service corporations and those which are not within that category, exists and is enforced under what is known as the "police power" of the state, which is exercised for the protection of the public health, safety, morals or welfare.

## Constitutional Basis for Regulation

As introductory to any detailed discussion it is desirable to refer to existing constitutional provisions which, in the United States, substantially touch the subject. The Fifth Amendment to the Federal Constitution provides among other things, for the control of Congress and the national government, that no man shall be "deprived of life, liberty or property without due process of law, nor shall private property be taken for public use without just compensation"; and the Fourteenth Amendment to that Constitution further provides that no state shall "deprive a person of life, liberty or property without due process of law." The Constitutions of most of the states in substance duplicate, by express enactment, these provisions of the Federal Constitution, thereby, quite independently of the latter, restraining their own legislatures,—the Constitution of the State of New York (for example) declaring *verbatim* that "No person . . . shall be deprived of life, liberty or property without due process of law, nor shall private property be taken for public use without just compensation." So that, if the clauses quoted from the Federal Constitution were to be wholly repealed, the citizen of the State of New York would still be fully protected in his life, liberty and property against invasion by any state authorities, until and unless the State Constitution should likewise be amended.

The terms "life, liberty and property" as employed in the Constitution of the United States and of the several States have been given the broadest interpretation by the courts. "Life" is life and need not be defined; "liberty" has been held to cover not only freedom from personal restraint or imprisonment, but complete freedom of contract and dealing; and "property" is held to include not only tangible, such as real estate and chattels, or even stocks and bonds and notes and other items which are evidenced by some visible token, but a multitude of intangible rights which enter into the value of property, such as the power to sell the same to whomever the owner may choose and to use the same in proper ways for the comfort or advantage of the owner himself.

## Authority of Legislatures

It was at one time believed and argued by some that, in view of the breadth of the definition given by the courts to these terms, the people of the United States and of the states had, by the constitutional provisions to which I have referred, deprived themselves of all power to regulate corporations or businesses in any direction which interfered with the unlimited enjoyment by owners of their property and the unrestrained exercise of their liberty of contract and dealing, and that the people were limited to the actual taking by condemnation of such property as the public might require upon payment of a proper compensation therefor judicially determined to be just. Written constitutions, of the character of those established for the Federal government and the states, for the protection of the people against their own legislatures, were unique at the time of their establishment here, as all or most of you know. Even Great Britain, generally regarded as the most enlightened of nations, then had and yet has no written constitution by which the people have in any way curbed the powers of Parliament; so that Parliament then had and to-day has complete power to deprive any person within its jurisdiction of his life or liberty or property without judicial action or any compensation, by the mere passage of an Act of Parliament to that end; and as a matter of fact it has passed many acts, such as the "Land Purchase Act" for Ireland, by which the state has compelled the sale by private individuals of portions of their property to other private individuals and at compulsory prices, which would be clearly impossible to the American Congress under our Constitution. Parliament is restrained in its action by nothing except the sense of justice of its members, and the weight of public opinion, which presumably would not tolerate arbitrary and unjustifiable measures; but the power exists in Parliament, curbed only by such considerations, and it often passes acts in its unrestrained discretion which a considerable part of the electorate do regard as both arbitrary and unjustifiable, but in respect of which they can appeal to no Court and are remediless, the power of Parliament being supreme and not subject to review by any tribunal. An "appeal to the Country," on dissolution of Parliament is the only recourse of the dissatisfied.

There were those who feared that the American people, in placing a constitutional curb upon the powers of its legislatures, had only jumped from the frying-pan into the fire; had guarded itself against legislative abuses affecting life, liberty and property, at the expense of allowing full rein to individual use of property and individual liberty of action, even although it might seriously affect the public interest. This apprehension proved, however, not to be well founded; for in spite of the very broad language of the constitutional provisions to which we have referred, the courts have held that the legislature may yet regulate business activity and processes, even though such regulation curtails to some extent the liberty of action of the citizen and the unrestrained use and enjoyment of his property, provided and to the extent that such regulation is necessary for *the protection of the public health, morals, safety or welfare.*

But who shall say whether a proposed legislative enactment does have reasonable relation to the public health, morals, safety or welfare? It will readily occur to one that, if the legislature is to be the final judge on this point, a wide door has been opened for the nullification of the constitutional provisions against depriving a person of his life, liberty or property; for a hasty or unwise legislature might in that event, under guise of the exercise of the "police power," very substantially affect the liberty or property of the citizen, although it might be claimed by others that the enactment had in fact no reasonable bearing on the public health, morals, safety or welfare.

## Power of the Court

The majority in Congress, and many eminent statesmen, in the early days of this government, strenuously contended that it was for the legislature to determine this question; that the courts had no power to overrule the judgment of the legislature and that the declaration of Congress that an act was necessary in the exercise of the police power gave it as unassailable a standing as an enactment of the British Parliament. Indeed it was contended that courts had no power to declare *any* act of Congress unconstitutional; the power resting in Congress alone to determine that fact as to its own enactments, the courts having nothing to say in the premises. It took long litigation and a decision of the Supreme Court to negative this proposition. But it was finally firmly settled that it is for the courts to determine whether an act of Congress or a state legislature is constitutional and whether an act passed under the guise of the police power affecting the life, liberty or property of the citizen has in fact such reasonable relation to the public health, morals, safety or welfare as to fall within the police power and therefore be valid in spite of the constitutional limitations. Stated from another angle, the courts held that the "due process of law" mentioned in the Constitution, in accordance with which alone a man might be deprived of life, liberty or property, meant procedure through the processes of the courts; that accordingly, only by a decree of the courts entered after the citizen had been heard and the cause determined in orderly course, could his life, or liberty, or property be affected, unless the enactment threatening it was found to fall within the police power of the legislature; and that on the point as to whether it did so fall, the citizen might appeal to the courts for a decision. If the courts find that a particular statute has reasonable relation to the public health, safety, morals or welfare it is allowed to stand, as within the police power; if, however, it is found that the act has no reasonable relation thereto, it is declared unconstitutional and void. In illustration, the famous Bakery case arose under a statute of the State of New York prohibiting any man from working in a bakery over nine hours a day; the statute was sustained as constitutional by the courts of the State of New York; but it was declared unconstitutional and void by the Supreme Court of the United States, who held that the record did not show that the act had any relation to the public safety, health, morals or welfare, in that it did not appear that it affected the public adversely for a man to work in a bakery more than nine hours a day any more than to work in other employment for more than that period, and that therefore the act was not within the police power. That is to say, the court held that the baker had been deprived of his liberty, his liberty of contract and of working ten hours if he pleased, and that this interference with his liberty was not necessary in any public interest which was disclosed by the record. Most such legislative acts recite as a preliminary that they are passed in the public interest or from public policy, doubtless with the view that this expression will be taken by the courts as more or less convincing if the constitutionality of the act is judicially tested; but, as above said, such a recital is not at all controlling, and many or most of the acts passed in the alleged exercise of the police power which have been declared unconstitutional, have contained such recitals.

### Regulation as Police Power

The fields within which, under the police power, corporations in general, whether engaged in a public service or in purely private ventures, have been held subject to legislative regulation although to some extent affecting the liberty or property of the citizen, are many. Thus we have statutes relating to record of deeds, providing that one purchaser of real estate may lose his title if he fails to place his deed on record and the former owner gives a deed to another purchaser who thus acquires title in good faith and without knowledge of the previous conveyance, the first but negligent grantee being thus deprived of the entire equity in the land and left with only a cause of action against a wicked grantor who may be possibly worthless; statutes relating to weights and measures of merchandise, which compel tradesmen to go to some expense and to some extent limit their liberty in dealing; statutes relating to pure food labels, forbidding the sale of certain articles unless defined as to their constituents, thereby possibly rendering their sale less easy or less profitable; statutes limiting the hours of labor of women and children, or forbidding children under a certain age to be employed in labor at all, or even forbidding men to work in certain vocations beyond a certain number of hours per day, where it has appeared that other or greater hours of labor were inimical to the public health or morals, the individuals affected being to that extent deprived of their "liberty" of contract and action in the interest of the public welfare; and statutes limiting individual action and use of private property in many other ways, where the public interest was deleteriously affected. And where the power of regulation is constitutionally exercised, that is to say, within the proper limits of the police power, it is all embracing, and no respecter of persons or employments. To use the language of Justice Lamar of the United States Supreme Court in a very recent case,

> "The power of regulation is all-pervading * * * for the power to regulate is the essential power of government which can be exerted against the whole body of the public or against the smallest business."

Thus the Interstate Trade Commission Bill now pending before the houses of Congress provides for very broad regulation of corporations engaged in interstate or foreign commerce, giving power to the proposed commission to make investigations, require regular or special reports, examine the books and records, and otherwise concern itself with the affairs and management of all such corporations.

But this power of regulation, although no respecter of businesses, is relatively limited in scope in the case of those which are not conducted as public services. Thus the owner of land may (in some cases, at least) be controlled as to the height of the building which he may erect thereon, and to that extent be deprived of some of his liberty and of some part of the value of his land by reason of such limitation in its full use, but he cannot be regulated to the extent of fixing the price which he shall charge tenants for space or the use which he shall make of his land or the buildings thereon, so long as he does not establish a nuisance thereon; nor can a merchant or tradesman be compelled to sell goods to customers other than those he selects, or to deliver merchandise to customers at a price which he does not approve, or even to deliver the same wares to all customers whom he does accept at the same price, although he can be compelled in some cases to label his goods or otherwise to order his dealings in such manner as may be necessary to protect the public. For in respect of such private businesses, Judge Cooley has said that since the establishment of our Constitution,

> "It has been commonly supposed that a general power in the state to regulate *prices* was inconsistent with constitutional liberty;"

and commenting on this statement Justice Lamar, in the case above mentioned, said:

> "That common supposition is rightly founded on the fact that the Constitution recognized the liberty to contract and right of private property. They include not only the right to make contracts on which to acquire property, but the right to fix the price of its use while it is held, and the further right to fix the price if it is to be sold. To deprive any person of that is to take property, since there can be no liberty of contract and true private ownership if the price of its use or its sale is fixed by law. That right is an attribute of ownership."

## Public Service Businesses

But beyond this general regulation so applicable to all businesses, there is a special and extraordinary regulatory power existing in the legislature as affecting what are commonly called "public service corporations," or even individuals engaged in such public service. To constitute a public service of the character in mind two things must concur; to use again the language of Justice Lamar, "(1) the business must be affected with a public interest, and (2) the property employed in such interest must be devoted to the public use," in which case the learned Justice says, quoting Lord Hale:

> "When private property is affected with a public interest it ceases to be *juris privati* only."

The special regulation in regard to such corporations, speaking in very general terms, commonly covers requirements that such corporations must serve the public without distinction; that their charges for product or service must be the same to all customers; that they must keep themselves in position to furnish adequate service and to extend it within reasonable limits; and finally, and most important, that the rates of the charge for their product or service shall be just and reasonable. So, too, uniform systems of account are often, and very properly prescribed for all public service companies of the same class, for better accounting and more easy comparison.

## Justice Lamar on Rate Regulated Corporations

But rate-making is, of all manifestations, the most serious and common aspect to public service corporations of this special regulatory power of the state; and, quoting again from Judge Lamar,

> "The list of rate regulated corporations is not too long to be here given. It includes canals, waterways and booms; bridges and ferries; wharves, docks, elevators and stockyards; telegraph, telephone, electric, gas and oil lines; turnpikes, railroads and the various forms of common carriers, including express and cabs. To these should be added the case of the innkeeper (as to which no American case has been found where the constitutional question as to the right to fix his rate has been considered), the confessedly close case of the irrigation ditches for distributing water (193 U. S. 379), and the toll mills acts. This of course does not include the case of condemnation for governmental purposes or for roads and ways where no question of rates is involved. There may be other instances not found, but it is believed that the foregoing enumeration exhausts the list of what has heretofore been treated as a public business, justifying exercise of the price fixing power against persons or corporations.
>
> "It is to be noted that in each instance the power to regulate rates is exercised against a business which in every case used tangible property devoted to a public use. Some of them had a monopoly (Spring Water Co. v. Schlotter, 110 U. S. 354). Some of them had franchises. Most of them used public ways or employed property which they had acquired by virtue of the power of eminent domain.

> They were therefore subject to the correlative obligation to have the use, of what had been taken by law, fixed by law. And as further pointing out the characteristics of the public use justifying the fixing of prices, it will be noted that, with the exception of toll mills (which however, do not employ property devoted to a public use), they all have direct relations to the business of the facilities of transportation or distribution—to transportation by carriers of passengers, goods or intelligence by vehicle or wire—to distribution of water, gas or electricity through ditch, pipe or wire; to wharfage, storage or accommodation of property before the journey begins, when it ends, or along the way.
>
> "When thus enumerated, they appear to be grouped around the common carrier as the typical public business and all employing in some way property devoted to a public use.
>
> "It will be seen, too, that the size of the business is unimportant, for the fares of a cabman, employing a broken-down horse and a dilapidated vehicle can be fixed by law as well as the rates of a railroad with millions of capital and thousands of cars transporting persons and property across the continent."

## The Fire Insurance Case

To the list of the public service corporations enumerated by Justice Lamar, as so subject to regulation in regard to their rates, the Supreme Court of the United States seems to have added Fire Insurance Companies, by its opinion handed down on April 20, 1914, over the dissent of Justice Lamar, with whom concurred Chief Justice White and Justice Vandeventer, in the case of *German Alliance Insurance Company, Appellant*, vs. *Ike Lewis as Superintendent of Insurance of the State of Kansas*. In the case in question a majority of the court held that, in view of the peculiar character of the business of fire insurance and its close relation to the public interest, the rates of charge of such companies within the State of Kansas might be fixed by legislative authority, in spite of the fact (as Justice Lamar points out) that their property was not devoted to the public use in the same sense as that of the other businesses enumerated by him, and that to this extent the decision of the majority was a departure from previously accepted principles. It is difficult to see the length of the road which the Supreme Court may travel, if it follows to the end the novel principle adopted in this Kansas case. Reasons may be found by the court for stopping at this point; it is at any rate not worth our while to speculate upon the future; but it opens a new field for discussion and may be viewed with some apprehension by those who have supposed that the definition of what constitutes a "public service corporation," with all that this implies as to power of special regulation, had theretofore been definitely settled.

It would of course in the limited time at our disposal be wholly impossible to consider in any detail the general powers of regulation applicable to business in general, or even the principles governing the special regulation of public service corporations in all the directions to which we have referred. Each field has been the subject of extended discussion and consumed hundreds of pages of text books and pamphlets. I shall accordingly select for discussion but one phase of such regulation, choosing it both because it is the most common exercise of the police power in relation to public service corporations and is the most obvious if not the most important to the customers of the company. It is one at any rate in which they usually demonstrate the greatest interest. I refer to the matter of rates.

## Establishment of Commissions

Until within a comparatively few years the establishment of rates for public service corporations was by direct act of the legislature. Thus the charges per thousand feet for gas in the City of New York were fixed by act of the legislature in the middle 90's, at $1.25, with a reduction of five cents per year until the dollar rate was reached. It was not until 1905 that a commission was established in this state for the supervision of public service corporations, other than railway corporations which were already in some degree subject to the control of the old Railroad Commission. While in the establishment of a general commission, New York was somewhat behind a few other states, notably Wisconsin, in no state has a commission been in existence for more than two decades possessed of power to establish rates of charge for public service corporations. The advantage of a commission for purposes of regulation, whether it relate to accounting, character of service or rates, over direct action by a legislature, is too obvious to need discussion, assuming a competent commission. The legislature in the fixing of rates commonly acts upon the report of a committee whose investigation is confined within a single session of the legislature. It is utterly impossible within that time to make proper investigation of all the facts and circumstances entering into the question of a proper rate of charge. As an illustration, the Stevens Committee of 1905 appointed by the Legislature of this State, essayed within a period of thirty days to investigate and determine the capitalization, cost of production, value of property and all other necessary details, affecting over thirty gas and electric corporations located within the boundaries of the present City of New York. Such a task, even when the Committee was assisted by so great capacity as that of its distinguished counsel, afterward Governor and now Justice Hughes of the Supreme Court, was too Herculean to make possible accurate results. Thus the value of the property of the Consolidated Gas Company was found by that Committee not to exceed, $30,000,000, inclusive of franchises; whereas the value of such property, as ascertained by the court two or three years later in the Eighty-cent Gas case, after a trial lasting many months, was about $56,000,000; and including the value of property of other companies aiding in the production of the gas sold by the Consolidated Company to its customers was found to equal about $68,000,000. The result of this hasty action of the Committee was necessarily inaccurate and a great injustice to many of the corporations which it was investigating. The proceeding is now sufficiently in the past so that any impartial mind which is interested to examine, can easily see the facts, and have before it a good illustration of the unwisdom of hasty action by the legislature in such a case, such action, to make a bad matter worse, being almost invariably complicated by political considerations. It is important for the public to appreciate this situation; if a legislative act fixing rates is passed in the usual manner it is possible that it does justice, but if it does so, it is usually a matter of Providence only. And such legislation, where a commission is in existence, is vicious to the last degree in principle as well as usually in result.

On the other hand, a commission may proceed at leisure. It has opportunity for complete examination as to all essential facts. Its members are in office for a term of substantial length, so that they should be more independent than are legislatures of popular disfavor or of popular acclaim. I think no case will be found before the present public service commissions, involving even one small company, where they have been able under several months to make proper investigation and reach a conclusion; and in many cases their consideration has extended over years. The results reached by them should, therefore, be much more accurate, and therefore more just and satisfactory, than those following from direct legislative action; and it is fair to say that this has been on the whole the case,—indeed, I may say almost invariably the case, even when the action of commissions has fallen short of perfection, as it is sure sometimes to do until we have commissions composed of omniscient angels in place of men of like infirmities with ourselves.

## Elements in Rate Making

It is held that rates, whether fixed directly by the legislature or by commission, must be just and reasonable; they must be fair to the public, and sufficient to afford a just return to the owners upon the value of the property devoted to the public service; any lower rates are held to be unconstitutional as taking the property of the owners without due process of law.

The first matter to be considered is the value of the property employed, upon which the owners are entitled to a return. The "great and substantial question of fact . . . is as to the value of the plant" (in the language of Judge Hough in the Consolidated Gas case); and to this must be added the intangible property going to form the complete operating whole. This is a brief and may seem like a simple proposition; but it has taken many years and multitudes of decisions to determine what elements of property shall be included in the total valuation, the basis upon which they shall be valued, and the amount (if any) which shall be deducted therefrom for depreciation to reach the ultimate base upon which the return is computed.

So, too, what constitutes a fair rate of return has been the subject of innumerable decisions, and even now no uniform rate has been or can be settled as applicable to every case; and in this connection we are obliged further to distinguish between a rate of return which may be barely non-confiscatory and therefore constitutional, and a rate of return which is commercially just and fair.

As to the ascertainment of net income applicable to return on the investment, this also has its difficulties; for in operating expense we not only deal with expenditures which are certain, but must allow therein likewise for reserve and contingent funds to cover replacements and other requirements more or less uncertain as to amount or periodicity; and the allowance for such funds is often the subject of sharp debate.

These essential elements, in the establishment of reasonable rates, we will briefly consider.

Precisely what "value" is, and how it may be measured in the case of property (especially that of corporations of the character here under consideration), has been the subject of wide discussion by courts, commissions and economists.

(a) Where property is of a character which has common and frequent sale, the "market price" so established is very properly applied as a measure of value of similar property when we are dealing with the subject of seller and purchaser.

But in the case of the ordinary public service corporation, such property is rarely the subject of sufficiently frequent sale to establish a reliable market price; and besides, company and consumer do not stand in the relation of buyer and seller of the property.

(b) Again, it has been sometimes observed that the value of the securities of a company in the open market is a fair test of the value of the property, as representing the estimate of investors in that regard.

But it is now generally conceded that such a test is insufficient, since the market quotations of such securities fluctuate from month to month and year to year in accordance with the condition of industry, of the money market, of speculation and of many other circumstances which easily occur to the mind.

As Judge McPherson put it in the Des Moines Water Company case (192 Fed. Rep. 197):

> "The value of stocks and bonds is no test for obvious reasons, and mere theorists only at the present day insist upon such a valuation. Practical men know that it is not the test."

(c) Nor, for two important reasons, are records of original cost of a property to be accepted as a fair test of its value for rate-making or other purposes. In the first place the original cost of a property of any age is exceedingly difficult, indeed virtually impossible, to obtain. I have never known of a case where the books of a company, no matter how well kept, accurately showed it. It is the custom of prosperous companies to improve and better their plants largely, at the expense of earnings so that what are really additions to capital value are charged into operating expense under the guise of repairs or other similar heading, instead of being added to the construction account. Thus a line of four-inch main might be replaced by an eight-inch main, and the entire amount charged as a replacement, although really there has been an addition to capital value representing the difference between the cost of the four-inch pipe and the eight-inch pipe; but unless the voucher was available and it specified in detail the sizes or values of the two pipes, the added value due to the greater pipe would not appear in the records of the company at all as a capital item. Hence it is almost an axiom that in prosperous companies the capital account on the books fails to represent the full cost of the production of the property. As an extreme instance it appeared in the Consolidated Gas case that while the average structural value per thousand feet of sales for the gas plants throughout the United States in 1900 was $7.23, and the valuation of the Consolidated Gas property itself, in spite of its enormous output, represented over $4.00 per thousand feet, the Gas Company located at Haverhill, Massachusetts, showed on its books a structural value of only *sixty-three cents* per thousand feet of sales, a positively absurd figure, due to the fact that its plant had been constantly and largely increased out of earnings and betterments charged to operating expense without any representation in the capital account whatsoever.

On the other hand, unsuccessful companies are sometimes prone to pursue the opposite course; and in order to keep operating expense below income, or to save an apparent margin sufficient for dividends, often charge to capital account items which should have gone to current operation, so that the book capital exceeds the actual cost of production of the property.

And in the second place the Supreme Court of the United States, followed of course by other courts, has fully established the proposition that it is the *present value* and not original cost, which frequently differ largely (especially in such items as land) upon which the corporation is entitled to compute and earn its return.

## Present Value the Basis

The Supreme Court in the Consolidated Gas case, in dismissing the state's contention in favor of original cost as the basis of valuation, referred to the court's previous expressions and said:

> "There must be a fair return upon the reasonable value of the property *at the time it is being used for the public* * * * .
>
> "We concur with the court below in holding that the value of the property is to be determined as *of the time when the inquiry is made* regarding rates.
>
> "If the property which legally enters into consideration of the question of rates has increased in value since it was acquired, the *company* is entitled to the benefit of such increase. This is at any rate the general rule.'

And following this, Judge McPherson said in the Des Moines case:

> "What a plant cost originally is not the measure of value that courts must look to, to determine the validity or invalidity of rates."

Hence as has been said in one case or another in the federal courts, the owner of the property is entitled to "any appreciation of value above the original cost and the cost of the improvements which is due to what may be termed natural causes," such as "improvements made in the vicinity of the property, the growth of the city or town where it is located, the building of railroads, the development of the surrounding country, and like causes," in the same manner as any other owner becomes vested with any increase in the value of his property, no matter from what cause originating; and it is said that the owner would be deprived of the increased value so produced "without process of law, and without compensation," if he were prevented from "realizing an income commensurate with the enhanced value of the property."

And so, too, a plant that has been some time in operation must be valued as it is, if it has been prudently constructed and developed, even though the works if now rebuilt might be constructed according to a different or improved type. It is the present value of the present plant which is to be ascertained; and not the present value of some hypothetical plant, which omniscience might have constructed.

If the present plant is not sufficiently efficient to produce product or deliver service economically, it may be that a newer or better plant operating at a less expense may be able to serve the public and yet make a fair return at a rate of charge which will destroy the business of the older company; but this is a risk which the older company took when it entered business, and a destruction which might result from economic causes, cannot be forced upon it by a compulsory reduction of rates below that which would only be a fair return upon the value of its property.

### Relationship of Earnings to Capitalization Not a Proper Basis for Valuation

(d) It has also been argued that the value of a property depends upon its net earnings, and should be computed by capitalizing such net earnings at a fair rate. This is in a sense true, and in case of a corporation not engaged in a public service and not subject to public regulation as to charges, the value of its property may be fairly determined by capitalizing the net earnings upon a reasonable basis of return for that industry.

But obviously such a method is out of the question in considering the value of the property of a public service corporation in connection with rate making; for, the law being firmly established that a public service corporation is constitutionally entitled to a fair and reasonable return upon the value of its property devoted to the public service, the first thing to be done is clearly to determine the value of such property and then to determine whether the present or any proposed rate yields or will yield net earnings equal to such fair and reasonable return thereon. To take the earnings as they exist, and by capitalizing them procure the supposed value of the property, would put the cart before the horse; and it would inevitably result in every instance in the vindication of the existing rate, the net earnings resulting from such rate being capitalized upon an assumed fair percentage of return to determine the value of the property, and then this percentage of return being computed upon such valuation and producing exactly the net earnings with which we started, completing the circle.

Thus where earnings were large, and charges possibly excessive, a capital valuation would be shown far exceeding the cost of production of the property with other appropriate elements of value connected therewith; while in the case of inadequate rates and small earnings the result would be directly the reverse. This method of determining value must, therefore, in rate cases at least, from the very nature of the conditions, be discarded as impossible. As was said by the Public Service Commission for the First District in the Kings County Lighting case:

> "The present case is a rate case, the fundamental question being to determine the reasonable income to be collected from gas consumers. Consequently computations to determine fair value or fair return based upon present income are unsound and illogical."

### Reproductive Value

(e) The standard which has now been generally adopted by courts and commissions in determining the value of the tangible properties of public service corporations, makes the cost of reproduction the main and usually controlling, and frequently the sole, element of consideration.

It is true that the Supreme Court of the United States in the leading case of *Smythe* v. *Ames*, 169 U. S. 466, suggested that in ascertaining value there might likewise be considered the original cost of construction, the amount and market value of bonds and stock, the probable earning capacity of the property under particular rates, and other matters which were "to be given such weight as may be just and right in each case"; but these elements are now commonly applied rather as tests for the correction of the accuracy of the estimate of reproduction than as serious standards of themselves.

In the *Smythe* case it is important to note that the Union Pacific Railway with which that case had to deal had been constructed during or immediately following the Civil War, with the aid of government loans, when currency was depreciated; with the result that the cost of construction, and the stocks and bonds outstanding for that purpose, represented an amount *much exceeding the cost of reproduction at the time the action was brought;* and it was in such circumstances that the court held that the original cost of construction and the amount of securities so issued, were entitled to be given weight in addition to reproductive cost, in determining the present valuation upon which the company was entitled to earn a return. Thus the *Smythe* case was peculiar, differing from the usual case in that in the latter the cost of reproduction is commonly at least equal to and usually exceeds original cost of construction.

After reviewing at much length and with great care the previous decisions of the federal courts, Judge Hough in the Consolidated Gas case said:

> "It is impossible to observe this continued use of the present tense in these decisions of the highest court without feeling that the actual or *reproductive* value at the time of the inquiry is the first and most important figure to be ascertained" (157 Fed. Rep. 849).

And in a later case (*Shepherd* v. *Northern Pacific Railway Co.*, 184 Fed. Rep. 803) Judge Sanborn said:

> "The Master rightly decided that the *cost of reproducing* this property new was a more reliable measure of its real value than the original cost of its acquisition and construction or the market value of the stocks and bonds of the companies, and upon that basis he made his findings."

While the Supreme Court upon other points reversed the judgments in these two cases, they expressed concurrence with the above view of Judge Hough in the Consolidated Gas case and no dissent from the proposition quoted from Judge Sanborn in the other.

And the Railway Commission of the State of Wisconsin, which by reason of its long standing and extended consideration of the problem, carries with it perhaps greater weight than the views of any other commission, said in the case of the *Chicago, Milwaukee & St. Paul Railway*:

> "The cost-of-reproduction method carries with it a greater degree of demonstrable certainty and conviction than all the others which have been proposed."

### Ascertainment of Reproductive Cost

Ascertainment of the reproductive value of the physical property is, in the case of corporations of any size, by no means simple. It involves elements of information and judgment which require engineering skill of high degree. It is said that the physical valuation of the railways of the United States recently authorized by Congress will cover five years and cost $10,000,000. I express the view that it will cover twice that period and cost more than twice that sum to the national government alone, to say nothing of the incidental cost to the railways; and that after the valuation is completed it will then be so far behind the times that it will in hardly any case represent the full value or present value of the property, and in the case of most railways it will never be of any value at all except statistically.

In making such a valuation, the first procedure is to work out an inventory of the physical property. This is a work of great time and labor, for exactness is important. In the case of the plants of the Consolidated Gas Company it was conceded in the Eighty-cent Gas Case that it would take a year s work of an expert engineer with competent assistants to make a complete engineering inventory of its physical assets, if such engineer started without previous knowledge of the plants. A mere enumeration of the machines, structures and apparatus is not sufficient; indeed, it is practically worthless without other information more difficult to acquire. An apparatus may be standing on a foundation the mere construction of which cost more than the apparatus itself; and in this connection there may have been required in addition excavation or piling costing as much as the foundation did; so that the apparatus visible to the eye would not represent one-third its cost installed and ready for operation. Hence the character of the soil upon which plants are located, of the foundations of all structures and machinery, the existence of rock which had to be blasted away and the original presence of which is not now apparent to the eye, and a thousand other circumstances and facts must be taken into account, which are ascertained only by long and careful investigation and the importance and added expense of which can then only be determined by the estimates of competent engineers skilled in the special business under investigation.

It is often necessary to know the exact weight of a piece of apparatus in addition to its character and function, and even the ordinances and regulations of the municipality where the company is operating in order to reach correct results.

### Inaccurate Appraisals

Thus in the Consolidated Gas case an entirely fair witness gave the valuations of certain gas holders of the Company at figures which he supposed just, estimating the holders with frames to be of a certain weight. Of course it is impossible physically to weigh such holders after they have been installed; but fortunately a witness for the Company had been the chief engineer of the company that manufactured and installed the holders, and was therefore able to produce the exact "shipping weights," with the result that their weight and value was found to be substantially greater than that given by the previous witness.

Again in the same case the estimate by the Company's witnesses of the cost of reproduction of its mains as then laid in the streets was $12,636,000. One of the witnesses for the state estimated such cost to be only $8,900,000—about two-thirds as much; but on cross-examination it appeared that he had made no allowance for bridging cross-streets to accommodate continuous traffic, which is required by the city regulations where mains are being laid; had allowed nothing for "sheathing" of the trenches, which is almost universally necessary in this city by reason of the multitude and character of subsurface construction; had made no allowance for blocking and wedges, which are found under every main in the Borough of Manhattan; had assumed that the mains would be laid by "puddling" instead of by tamping, which is a more expensive method, not knowing that the city engineer's regulations forbade puddling; and when these and other elements of cost, which he had omitted in his estimate, were computed and added to his original $8,900,000, they produced a total of about $13,510,000, or nearly a million dollars more than the company itself claimed as the value of its mains. This is a fair, and not exaggerated, illustration of the worthlessness of the views of experts, even engineers, who are not both fair and competent and also fully informed as to local conditions and requirements. Indeed, their testimony is worse than worthless, for it is utterly misleading and as an almost invariable rule produces a valuation far below the actual cost of production or reproduction of the property regarding which they speak.

## "Overhead Charges"

Of course the total cost of production or reproduction of physical property far exceeds the cost of bare material and labor. To that cost must be added certain additional expenditures known as "overhead charges," covering in general interest on capital during the period of construction, contractor's profit, engineering and supervision on the part of the company and an allowance for contingencies.

The profit of the contractor is rarely less than 10% on the cost of labor and material. It often reaches 15%, which percentage was allowed on the Consolidated Gas plant in the case mentioned. This must be allowed because a company rarely produces its plant by use of its own facilities; it is cheaper to employ the contractor and pay him a profit than to establish a building plant of its own and gather a force for that purpose who could not have the expertness of men constantly employed in construction. If the Company does add to its original plant by use of its own force, the extra cost of "piece-meal" construction will be as great as the contractor's profit.

Interest during construction is usually computed on the cost of the plant for one-half the period of its construction. Thus, if it requires three years to construct, interest on the entire value is allowed for one and one-half years, on the theory that some part of the investment will be made at once and some other part not until the very end of the third year, but that the investment will on the whole average one and one-half years before the plant opens for operation; in which case the whole allowance would be 9% assuming money to be worth 6% per annum. Of course the results are only approximate, but on the whole acceptable.

For the Company's engineering, supervision and administration during construction are commonly allowed about 10%—sometimes more is required. No matter how good a contractor one employs, it is necessary for the company to lay out and give some attention to the construction of its plant, and to supervise with care the work of the contractor to see that he and his subordinates perform it properly.

For incidentals and contingencies is allowed a percentage varying from 5%, which is small, to 10%, which is rather large perhaps, although in special cases it has proven wholly inadequate. On the average something around 6% to 8% is commonly required. This covers defects in the inventory by omission of any items of property therefrom, losses from strikes or explosions or other accidents, expense from unforeseen conditions which may have developed in the work, and a hundred other possibilities which experience has taught will surely in some shape or another appear and increase the cost of the work beyond the limits of original vision. Thus in the Consolidated Gas case, in spite of extraordinary care in making the inventory of its property, it appeared after the evidence was in that two entire buildings with their contents, not the largest but still of substantial value, had been omitted from the inventory and valuation of the engineers.

Having now added to our labor and material, the "overhead charges" to which reference has been made, and which have been known to aggregate as much as two-thirds of the cost of such labor and material, we have what is known as the "cost of reproduction" of the physical plant.

### Working Capital

To this must be added other property, to be classed as tangible rather than intangible, commonly called "working" or "floating" capital. This includes the materials and supplies, such as coal, oil and pipe, which must be constantly kept on hand in sufficient quantity to meet all current requirements; and cash or its equivalent to meet the current expense of operation in anticipation of or beyond receipts from the customers of the company. Thus a gas corporation starting out in business must acquire supplies and materials from which it produces its gas, and must meet its pay-roll and make other expenditures requiring cash or equivalent, for a considerable period before it receives any return from consumers. Ordinarily no bills would be sent out until the beginning of the second month, and as they would not on the average be paid until the latter part of that month, there would be nearly two months during which the company would be obliged to finance itself without the aid of income from consumers, and for this purpose it requires its working capital. The amount of such capital, whether in materials and supplies or cash, usually bears some relation to the amount of the business of the company; but the relation differs with the character of the business, a street railway (for instance), which receives its income in the shape of cash fares daily, requiring relatively less working cash capital as an investment charge than a lighting company, whose income is considerably deferred. It is a matter of estimate, or experience, in each case.

### Intangible Property

Having now reached a valuation which includes the cost of reproduction of its physical property, plus the amount of working capital required for current operation, there are yet to be considered very important and no less necessary elements of value to make up the total valuation of the property of the corporation devoted to the public service. These additional items are usually classed under the name of "intangible" property; but they are intangible only in the sense that you cannot see them with the eye or touch them with the hand, as you can physical property. They cost money to produce, and in that respect they are very tangible.

Generally speaking this intangible property may be, and often is, divided into two classes: Cost of "organization and development," and cost of "going" or "going concern" value.

Cost of "organization and development," means the expense of formulating and promoting the enterprise, of organization of the company, of procuring consents and franchises to enable the company to operate, of procuring financial support for the construction of its plant and many items which will occur to one as necessary expenses before the work of construction actually begins. These, among other things, necessarily and happily include legal fees. It is impossible that a construction force should suddenly appear in the streets of a city prepared to lay down distribution mains and establish a production plant for a gas corporation, with no previous planning or preparation. It frequently takes years of persistent labor and effort to reach the point where, with funds in hand or provided, the enterprise has been organized and is ready to begin the work of its construction. It is not surprising, therefore, that this development and organization work may represent a cost equal to 20% or more of the entire cost of the physical property itself. The percentage differs, of course, with different industries and in different sections of the country, but it is an element which is now universally allowed, both by the courts and by public service commissions, in establishing the complete value of the company's property. The physical property never would have existed, and the service never would have been instituted by the public service corporation, except for this preliminary expenditure; and it is therefore in a very true sense as necessary an expense of the production of the physical property, as the amount paid for the materials and labor which enter directly into it.

But after the expenditures for organization and development have been completed, and the physical plant has been produced, and working capital has been provided, the total cost of the property devoted to the public service has not been reached. Beginning with the turning of the wheels there develops over a period of years, and must be allowed as an element of capital value, what is known as a "going value" or "going concern" value—expensive to acquire, valuable to possess and most important in the efficiency and profitableness of the operation of the company. That it is difficult to define and hard to prove as to exact cost, does not alter the case.

It is not to be confused with "good will," which has been said to be the tendency of customers to repair to the "old stand" once their patronage has been attached; for the Supreme Court has held that this is not an element to be capitalized against consumers in case of a public service company, since they ordinarily have but one stand to which they can repair, and therefore they have no choice.

Nor is "going concern value" to be confused with good management. It is not present at the beginning of operation, no matter how good the management; and no management can be so good that, from the moment of starting, a plant can be operated at its highest efficiency or to the greatest satisfaction of the public.

## Cost of Experiments

In the early stages operation is largely experimental and policies tentative; it is a matter of finding out what the public wants and the methods of doing business which net the best results. The system must gradually become co-ordinated in all its parts to the smoothest and most efficient operation; this involves constant experiment, adjustment, change and adaptation, the result of which is apparent in a company of some years of existence, but which cannot possibly be found in a plant just opening for business.

A company, after this going concern value has been developed, will upon the same business produce better service to the public and better net earnings to its owners, than at the outset of its operation before it has passed through this trying period of uncertainty and eliminated elements of friction which prevented the attainment of the highest combination of efficiency.

In illustration we might consider the Metropolitan Street Railway System in this city. It undoubtedly took years of trial and experiment to determine how cars should be routed best to accommodate the traffic; from what barns cars should be sent so that they would most quickly reach passengers in quantity and return to their barns at the conclusion of their trips with the least idle run; over what lines they should be passed so as to avoid stagnation at critical points, such as Twenty-third Street and Broadway, with the resultant slowing up of traffic; the arrangement of runs so far as employees are concerned, so as to cover the business of the company with the smallest proper expenditure for labor; the advantage of the cable over the old horse cars which it superseded and subsequently the feasibility of the underground trolley, whose efficient operation in this latitude was a subject of great doubt and the objections to which were overcome only after many trials and invention of many safeguards; the efficiency of storage or compressed air batteries on the Twenty-eighth and Twenty-ninth Street crosstown lines, in tests and experiments in which was spent $1,285,000 as shown to the Commission; and dozens of other features, tests and trials which required the expenditure of vast sums of money but which when concluded had put the company into possession of a fund of experience and knowledge which has resulted not only in added efficiency of operation, but in smaller relative operating expenditures and greater relative returns from the property for its security holders. All of this fund of experience has been acquired and become a valuable asset of the corporation. This process of development is proverbially and invariably expensive, and meanwhile cuts down the net returns from operation by reason of excess of expenses beyond the final normal, and often or usually results in payment of inadequate or no dividends, or even in actual deficit in operation, for a substantial period.

## "Going Value" as Defined by the Court of Appeals

The Court of Appeals of this State in the case of the Kings County Lighting Company, a few days ago rendered a decision defining "going concern" value and sustaining the right of that Company to include the same in the total valuation upon which it was entitled to a return in fixing rates to be charged consumers, and it is of such importance and local interest that I venture to quote from it:

> "If 'going value' is capable of ascertainment, it will not do for the Commission vaguely to consider it in fixing the fair rate of return.
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> * * * * * * *
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> "The difficulty of determining the 'going value' will not justify the disregarding of it. Rate making is difficult. But that will not justify confiscation. The difficulty, however, will lessen, as it does in most cases, when we cease to think about the subject vaguely. What then, is 'going value,' and how is it to be appraised?
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> "It takes time to put a new enterprise of any magnitude on its feet, after the construction work has been finished. Mistakes of construction have to be corrected. Substitutions have to be made. Economies have to be studied. Experiments have to be made, which sometimes turn out to be useless. An organization has to be perfected. Business has to be solicited and advertised for. In the case of a gas company, gratuitous work has to be done, such as selling appliances at less than a fair profit and demonstrating new devices to induce consumption of gas and to educate the public up to the maximum point of consumption. None of those things is reflected in the value of the physical property, unless, of course, exchange value be taken, which is not admissible in a rate case. The company starts out with the 'bare bones' of the plant, to borrow Mr. Justice Lurton's phrase in the Omaha Water Works case, *supra*. By the expenditure of time, labor and money, it co-ordinates those bones into an efficient working organism and acquires a paying business. The proper and reasonable cost of doing that, whether included in operating expense or not, is as much a part of the investment of the company as the cost of the physcial property.
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> "The investors in a new enterprise have to be satisfied as a rule with meager or no returns, while the business is being built up. In a business subject only to the natural laws of trade, they expect to make up for the early lean years by large profits later. In a business, classified among public callings, the rate making power must allow for the losses during the lean years, or their rate will be confiscatory and of course will drive investors from the field. In the former class, the value of the established business is a part of the 'good will' and may be determined by taking a given number of years' purchase of the profits, or exchange value may be considered. In the latter class, a different rule must be adopted.
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> "Referring again to the *Ames* case, *supra*, the public is entitled to be served at reasonable rates, and the corporation is entitled to a fair return on the property used by it in the public service, no more, no less, always assuming, of course, that the return is computed on a proper valuation. That was not made so by statute, but was the rule at common law, which justifies legislatures and commissions in fixing rates. If then a public service corporation has received more or less than a fair return, it has received more or less, as the case may be, than was its due, irrespective of whether a rate had been fixed by public authority. If a deficiency in the fair return in the early years was due to losses or expenditures which were reasonably necessary and proper in developing efficiency and economy of opera-

tion and in establishing a business, it should be made up by the returns in later years. If there was a fair return from the start, the corporation has received all it was entitled to, irrespective of how much of the earnings may have been diverted to the building up of the business.

"To view the matter in another aspect, take the case of a public service corporation with a plant constructed just ready to serve the public. It is going to take time and cost money to develop the highest efficiency of the plant and to establish the business. Three courses seem to be open with respect to rate making, viz: 1—to charge rates from the start sufficient to make a fair return to the investor and to pay the development expenses from earnings, a course likely to result in prohibitive rates except under rare and favorable circumstances; 2—to treat the development expenses as a loss to be recouped out of earnings but to be spread over a number of years, in other words as a debt to be amortized,—that involves complications, but would seem to be fairer to the public and certainly more practical than the first; 3—to treat the development expenses, whether paid from earnings or not, as a part of the capital account for the purpose of fixing the charge to the public. The last course would seem to be fairest to both the public and the company as well as the most practical

"It may be, as is urged, that a well conducted enterprise will charge the cost of developing the business to operating expenses, and that it would open the door to an overissue of securities to permit the capitalization of early losses. In answer, it is sufficient to say that we are dealing, not with proper methods of bookkeeping, not with proper capitalization upon which to issue securities, but solely with the fair return which the company is entitled to receive from the public. Treating a reasonably necessary and proper outlay in building up a business as an investment for the purpose of determining the fair rate of return to be charged is far from holding that it should be treated as capital, against which securities might be issued.

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"Assuming a reasonable need of the service from the start and that the failure to pay dividends was not due to bad management, an accumulation of a surplus or undivided profits, the investment of earning in permanent additions or betterments allowed for in the structural valuation, or to other causes besides those under consideration, none of which is assured, it would seem plain that "going value" was an element in this case which the commission was required to determine in making an appraisement on which to compute the fair return to which the company is entitled.

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"If the shareholders have been deprived of a fair return on their investment because of the time and expense reasonably and properly required to build up the business, they have, to the extent of that deprivation, added to their original investment and are entitled to a return upon it.

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"We are dealing, not with exchange values, but with the value upon which the company is entitled to earn a return. * * * Manifestly, a rate computed on the cost to-day of reproducing the bare plant would not be fair. Experience is proverbially expensive. With the advantage of that experience the same or an equally efficient plant could be constructed to-day at a cost much below the actual and necessary investment of the company in both plant and experience. Indeed, wholly apart from the intangible thing called the going business, the reproductive value to-day of the physical property would not necessarily include the actual and legitimate investment in tangible property which may have been entirely replaced, not because of depreciation, but to meet advances in mechanical science, new conditions and increasing demands not reasonably to have been foreseen at the start. * * * The term 'going value,' though not exactly defined, has been used quite generally to comprise the elements not included in the structural value of the property in its present condition. The term is not important. The point is that in some manner and under some appropriate heading a due allowance must be made for the investment in those elements. No inflexible rule will in the long run be just both to the public and the corporation. The right to limit the corporation to a fair return fixed by public authority necessarily involves the correlative right in the corporation to be assured of that fair return during all the time that its capital is employed in the public service.

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"Making proper allowance for the matters just considered and perhaps for others which do not occur to me, I define 'going value' for rate purposes as involved in this case to be the amount equal to the deficiency of net earnings below a fair return on the actual investment due solely to the time and expenditures reasonably necessary and proper to the development of the business and property to its present stage, and not comprised in the valuation of the physical property.

"It may be conceded that going value has no existence apart from tangible property and that commercially there is but one value, that of the property as a whole, but as the rate can not be made to depend upon the exchange value, which would in turn depend upon the rate, it would seem to be necessary to appraise the physical property and the going value separately, and of course that is the case if the cost of reproduction rule be adopted.

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"It remains to consider how 'going value' is to be appraised.

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"Obviously, the most satisfactory method is to show the actual experience of the company, the original investment, its earnings from the start, the time actually required and expenses incurred in building up the business, all expenditures not reflected by the present condition of the physical property, the extent to which bad management or other causes prevented or depleted earnings, and any other facts bearing on the question, keeping in mind that the ultimate fact to be determined is not the amount of the expenditures, but the deficiency in the fair return to the investors due to the causes under consideration. The business in this case was twenty years old, the books of the old company were not available, and it is of course problematical whether, if produced, they would have shown the necessary facts.

> The question, therefore, had to be determined, as all questions of fact have to be, by the best evidence available. Here, I may repeat, that mere difficulty in the proof would not justify a confiscatory rate. The value of the physical property was shown by opinion evidence as to the cost of reproduction. The same kind of evidence was given by two witnesses for the relator as to the cost of building up the business to its present state."

## Questions of Definition

In one respect I venture to disagree with the expressions of the learned Judge who wrote the opinion in the case last quoted.

He defines "going value" for "rate purposes" as "the amount equal to the deficiency of net earnings below a fair return on the actual investment" due to the expenditures reasonably incurred in the development of the business and property of the company, in addition to the value of the physical property. I believe it to be the sound doctrine that such expenditure represents the value of the "going concern" development, whether there is a deficiency in net earnings by reason of such expenditure or not. The language of the learned Justice literally read, would indicate that there could be no "going concern" value in the case of a corporation which earned a fair return on the investment from the beginning; and while the discussion may be academic because there is rarely found such a corporation, yet his proposition as quoted is believed to be unsound. Thus, a street railway system, may be profitable and pay adequate dividends from the outset; and yet it takes years, as in the case of the Metropolitan System, and a large expenditure, to acquire the experience and knowledge of conditions and traffic and methods of operation which will produce the best results, which expenditures will not have to be repeated, which would not have been necessary had the management been omniscient at the outset, and the result of which is a fund of knowledge and efficiency for which a purchaser would gladly pay as part of the capital value of the enterprise. This knowledge and experience is just as valuable to the owner of the property, and forms just as important a part of the whole investment, whether the moneys which purchase the experience and produce and develop the business comes from rates paid by consumers or from capital borrowed by the owner.

If the company was permitted in default of regulation by the legislature to charge rates so high that it was able to pay excessive dividends to stockholders, as well as to meet the expenditures of this experimental period which produced the "going concern value," that was merely the good fortune of the stockholders. What they earned and paid to themselves in dividends, belongs to them and cannot be taken away; and it does not in any way conflict with the proposition that the development of their business and the passing through the experimental period of its operation at a large expense never to be repeated, produce an element of value in the whole business which is not dependent for its existence upon the source from which the moneys came which produced it, or the question as to whether it resulted in a curtailment of dividends while it was being developed. This we believe to be the view of the weight of authority. The Public Utility Commission of New Jersey in the case of the Public Service Gas Company, operating in the Passaic and Paterson district, in an opinion rendered not much over a year ago on this point said:

> "It is true that the cost of new business in this last decade has been charged to operation and paid out of rates. But as we have indicated above, the business thus acquired must be regarded as a legitimate part of the property of the company. We cannot equitably project back into the unregulated past, a norm of prices that might to-day be regarded as fair and adequate, and assume that actual rates exacted in the past in so far as they exceed what are now deemed fair, have not lawfully become the property of the company. *If these high rates in the past have been employed by the company to acquire an intangible property* in the shape of extensive patronage, that expectation of patronage is theirs, and on its fair value the company is entitled to a return. It may or may not be a subject of regret that regulation was long deferred; but *deferred regulation is no excuse for refusing at present to allow a fair return upon what is the lawful property of the company.*"

Stated in another way it is the value of this going concern element which is to be considered; not the particular source from which the funds come which establish that value, or the effect upon the dividend rate of the company of their application in that manner. The value of the element may be measured by the cost to produce it during the development stage of the company's business; but it is worth just as much when produced, whether the funds to pay for its production came from stockholders or consumers or any other source. As Judge McPherson said in the Des Moines Water case:

> ". . . The street car system may have laid its rails and built its power plant and have bought its cars, but it does not have the *value* that it afterward will when its business has been adjusted and the people have adjusted their business and their conveniences to work in harmony with the system thus established. * * * It is not material whether we call it good will * * * or the value of a going concern,' but there is an *intangible value* there and the owner has the right to have it determined on such increased valuation."

## Allowances for Going Value

The amount allowed by courts and commissions in different cases to cover what we have referred to as "going concern value" has largely varied. In the case of the Omaha Water Company it was about 10% of the value of the physcial property; in the case of the Des Moines Water Company it was likewise about 10%; in the case of the Union Electric Light and Power Company of St. Louis it was about 6½%; and in the case of the Pioneer Telephone and Telegraph Company in Alabama it was 20%.

In the case of the Public Service Gas Company to which I have referred, the New Jersey Commission allowed 30% to cover both development cost before construction, and going concern value established after construction; the expert who testified to this sum declaring out of a wide experience that this was a fairly common or average allowance for going value, which view was accepted by the Commission. The conclusions of the Commission were affirmed by the Supreme Court of New Jersey in a very able opinion by Judge Swayze.

## Franchises

There is one other element of value which must yet be considered. That is the "franchises" of the company, entitling it to occupy the public streets and places with its fixtures. Such franchises have been held to be not mere licenses, but grants of a right of way so as to constitute an actual interest in land constituting the streets. Such franchises were in England held from the earliest times to be real estate, and are classed and taxed as real estate in New York. The Court of Appeals has said that they are "entitled to the same protection from invasion as any other species of property"; and the Supreme Court of the United States said in the Consolidated Gas case that they "cannot be taken or used by others without compensation" and that "the important question is always one of value."

How their value is to be ascertained is not entirely settled; the Court of Appeals has pointed out a method which may be pursued in establishing their value for taxation, but it is not clear that this is applicable in a case of rate-making. The subject is too complicated to treat in the time at our disposal. Suffice it to say that in the Consolidated Gas case the court found the value of its franchises to be $7,781,000, or over 16% of the value of the tangible property of the company, and such value was included in the total investment of the company upon which it was declared entitled to a return.

This total investment comprises, in summary, the cost of physical reproduction of the property, including percentage for overhead charges; the cost of the development of the project before construction; the going concern value which is developed subsequent to construction; and the value of the franchises of the character mentioned, whatever that may be ascertained to be.

## The Rate of Return

What rate of return shall the corporation be permitted to earn upon such total valuation as finally determined?

I refer to a commercially fair and just rate, which would presumably appeal to a public service commission, as affording such a return upon the value of the property employed in the public service as to assure capital proper recognition and reasonably encourage investment in such properties.

Of course this would be a higher rate of return than one which might be barely constitutional, that is to say, to use the language of the Supreme Court in the Consolidated Gas case, than one just high "enough to avoid the charge of confiscation."

In passing it may be instructive to observe the minimum rates of return which have been held by the courts to be constitutional. In the Consolidated Gas case the Supreme Court said that anything less than 6% would be so inadequate as to be unconstitutional; but this is an extreme case, since the court held that the company was a monopoly, that it was inconceivable that competition would ever be permitted, and that the hazard of investment was practically nothing, Justice Peckham employing the following language:

> "It is a corporation which, in fact, as the Court below remarked, monopolizes the gas service of the largest city in America, and is secure against competition under the circumstances in which it is placed, because it is a proposition almost unthinkable that the City of New York would, for purposes of making competition, permit the streets of the city to be again torn up in order to allow the mains of another company to be laid all through them to supply gas which the present company can adequately supply. * * * The Court below regarded it as the most favorably situated gas business in America."

And the distinction between the barely constitutional rate, and one which would be commercially fair is well indicated by Judge Hough's observation in the same case in the court below, where he said:

> "*It has not been asserted, and is not believed, that* 6 *per cent. is a profitable, satisfactory or attractive rate* for the investment of capital in the gas business. In my opinion, *it is none of these things*, but it is the lowest rate which, *in the City of New York*, can be considered *legislatively* fair to those who are already engaged therein *and cannot readily escape.*"

In the Cumberland Telephone case the Circuit Court of the United States held that anything less than 7% would be confiscatory and unconstitutional.

The same Court, in another circuit, likewise held in the Minnesota rate cases that anything below 7% would be confiscatory; and in the Des Moines Water Company case the Court held that an 8% return was moderate.

Coming now to a commercially fair rate, such as a legislature or commission would be presumed to desire to establish, it may be noted that the New York Mutual Gas Light Company was granted by the legislature in 1866 authority to earn 10% dividends and half of any net earnings beyond that, and the company is still operating in New York City under that act.

In 1900 a Committee of the Massachusetts Legislature referred to "the 10% heretofore recognized by custom" in that state as a fair rate.

In the investigation of the gas and electric properties in the City of New York in 1905, to which we have referred, the lowest rate suggested as fair and reasonable was 8%.

The opinion of the Gas Commission of this State, rendered in the following year, in an investigation of the Consolidated Gas Company and associated companies, declared that 8% was a "reasonable return upon the actual value of the property owned by the company and used in the manufacture and distribution of gas."

The present Public Service Commission of the First District later declared in the Queens Borough case that 8% was a proper rate; in the Brooklyn Borough case dismissed the petition for reduction of rates because the earnings then indicated a return of not more than 7.6%; and in the Kings County Lighting case fixed 7½% as a fair return.

In 1905 the Merchants' Association of New York, advocated 10% as a not unfair rate of return for the New York Telephone Company operating in this city.

It follows, I think, that even in the City of New York 8% is not more than a fair return for public service corporations; and in Connecticut, New Jersey, Wisconsin and other states similar views have been expressed respecting corporations there operating.

If the State were to guarantee dividends at a fixed rate to public service corporations, capital might possibly be interested at a slightly lower rate; but where it is considered that investors take the risk of loss if the enterprise proves disastrous, they must be permitted a liberal rate of return if the enterprise proves successful. Otherwise they will not be interested, the initiation of public service enterprises will be discouraged and the public will be the sufferers.

## Net Income

The determination of net income, by ascertainment of gross income and deduction therefrom of operating expense, is not always so simple a matter as it would seem on its face to be.

Looking at one side of the account, the amount of gross income would seem to be easily fixed. As a matter of fact items of dispute arise even here. Thus it has been asserted by one, and denied by another, that income from such merchandising business as sale of gas stoves is to be included. Under the accounting system prescribed by the Public Service Commission in this district, it is so to be. The argument to the contrary is that the company may at any moment go out of the gas-stove business, and that the rate which a consumer should pay for gas delivered should not be affected by whether the company makes a profit or a loss in its gas-stove business, which is entirely distinct.

Again it was declared a year or two ago by the Public Service Commission in this district, in the Kings County Lighting case, that increase in the value of real estate occupied by the company should be counted as income. This seemed extraordinary on its face, since the courts hold (as before pointed out) that any increase in the value of real estate belongs to the *corporation* and must be included in the total capital upon which it is allowed to earn a return. It could hardly be both principal and income at the same time. The Appellate Division of the Supreme Court, and later the Court of Appeals, effectually disposed of this fallacious theory of the Commission.

On the other side of the account there are even more difficult questions. If the receipts for stove sales are to be included as income, of course the expenditures for handling them must be included in expense; otherwise not.

The question sometimes arises as to whether amounts paid for rentals cover property altogether necessary for the business of the company, or whether only a portion of the property would not answer all purposes. This sometimes means an apportionment of rentals, part being included in operating expense and a part excluded.

## Reserve Funds

But perhaps the most troublesome question relates to the amount charged in operating expense for reserve funds to cover maintenance and contingencies of one sort and another. The amount charged by some gas companies is ten cents for each thousand cubic feet of gas sold; some charge thirteen cents; and some other amounts. There is hardly a rate case before a commission where there is not a dispute between the company on the one side and the seekers for lower rates on the other, as to the amount which shall be allowed in operating expense for such reserves; and it is fair to say that as a rule the commissions and their engineers have sustained the companies in their contention for a fairly liberal allowance. That something will happen sooner or later to make extraordinary expense, calling upon a reserve fund, is the one sure thing. A few years ago the Boston Gas Company was a flourishing concern paying good dividends regularly. One day an explosion occurred in the subway at Tremont and Boylston Streets, which was charged to be due to the leaking of gas. As a result of that one explosion the Boston Company had to pay damages so large that they compelled the complete suspension of dividends for a considerable period. So, too, apparatus of very great expense may in the gas or electrical business be suddenly found uneconomical and out of date, by reason of the invention of some new apparatus or process more efficiently performing the same function; and it may be necessary to make a very large expenditure promptly to substitute the new for the old. In this line I may observe that in the case of the Milwaukee Electric Railway and Light Company, the reproductive value of whose property was found by a commission to be $5,000,000, the court found that at least $2,000,000 additional investment (equalling 40% of the value of the then existing plant) had entirely disappeared and did not show at all in the property as then existing, a fact largely due to the rapid advance in the electrical art compelling constant supersession of one type of apparatus by another.

## Analysis of Operating Accounts

In presenting an operating account, the items both of expenditure and income are analyzed in great detail; the amount of each item being divided by the number of thousand cubic feet or other units of product sold, thus ascertaining the cost for each unit of output of this particular item of expense, which may run to a very small fraction of one cent in the case of many items. Thus in an operating schedule of a gas company now before me, I find that in one year the item "experiments" cost .03c. per per thousand feet of gas sold; "lime" cost exactly the same; while on the other side of the account there was received for the residual "carbon" .05c. and for "spent oxide" .06c. per thousand feet.

Such analyses make the costs and receipts of different companies easily comparable in detail, to the possible advantage of the companies as well as the information of the supervising authorities.

Having determined the gross income, the operating expense, and by deduction the net income available for return on capital, we are now in position to fix the rate.

## Fixing the Rate

Having already ascertained the total value of the property of the company, including both tangible and intangible, and the fair rate of return, it is necessary only to examine the net income ascertained in order to see whether it exceeds the sum obtained by multiplying the value of the property by the assumed rate of return. If it does, it is easy to compute with reasonable accuracy the amount which the rate may be reduced and at the same time leave a net income sufficient to pay the required percentage of return. But in this connection we must avoid a familiar fallacy; that, if the present net income is insufficient to pay the fair return, or is barely sufficient to pay it, a reduction in the price of the product will result in such an increase in sales as to produce an increase (or at least prevent any decrease) of net income,—in other words, that there will be an increase of profits from a decrease in price.

Nothing can be more unfounded; but in spite of the explosion in the Consolidated Gas case and elsewhere of this theory, it still persists in some misguided souls. Those who advance it leave wholly out of mind the fact that, if we do have an increase of sales we must likewise have increase of plant to produce the increased sales, and also to distribute them; so that, in case of increased sales, we have a larger amount of property to pay a return on and consequently require a higher amount of net revenue to pay it, than was the case before the sales began to increase. Consequently any profits from increased sales must be first applied to pay a return upon such increased assets, and cannot be applied to pay a return upon existing assets or to make good a loss of revenue on present sales resulting from a reduction in the price of the product.

## Requirements, Not Cost, Determines Consumption

As a rule people purchase all the gas or electricity which they require and no more; they do not burn an unnecessary amount of gas or electricity, which they do not require, merely because they can get it a little cheaper per unit; they save the money and wisely so. Consequently any reduction in the rate of charge does not commonly mean an extraordinary increase in the amount of the output. Indeed in the six-year period during which the Consolidated Gas Company was charging uniformly one dollar per thousand for gas, 1901 to 1906, the annual rate of increase in sales was nearly seven per cent.; while the rate of increase for the first three years, 1909 to 1911, after the Company began to collect eighty cents, was only four per cent., or not much more than half as great. This does not prove, of course, that the lower you reduce rates the less gas people are inclined to purchase; it does prove, however, that it does not follow from a reduction of rates that you are going to obtain an unusual increase per annum in output. It simply illustrates the fact that in buying gas, as in buying other commodities, people are affected by bad times and other circumstances much more than by a small difference in price; and the smaller annual increase under the eighty-cent rate than prevailed under the dollar rate is no doubt due to the hard times during the former period. Thus, in 1913, the sales of the Consolidated Gas Company were actually 87,000,000 feet less than they were in 1912 in spite of the increase in population of this Borough; and again the sales of gas by the Consolidated Gas Company were actually less in 1897 than they were in 1893 at the same price, in spite of a great increase meantime in population, because that covered a period of business depression and people were economical.

It is another interesting circumstance that the consumption of gas *per meter* in 1885 when the rate was $1.70 per thousand feet and the output only 3,942,000,000 cubic feet, was actually greater than in 1905 when the price had been reduced to $1.00 and the output was 13,282,000,000 cubic feet; the consumption per meter in 1885 being 36,000 feet per annum and in 1905 only 34,000 feet.

I could pursue illustrations almost without limit to show the fallacy of the theory to which I have referred.

I will only say in conclusion that I have met with no case where the profits of a public service corporation, already not more than fair and reasonable, have been increased by a reduction in the price of the product or service.

I wish my hearers to appreciate that a public service corporation is merely a seller of merchandise or service like any other business corporation; that the same economic laws govern it which govern them; and that any fantastic theories framed and promulgated in favor of rate reduction on the assumption that in some mysterious manner public service corporations are governed by different economic laws and can obtain something for nothing if occasion requires, are baseless and expensive in the long run both to a company affected and its customers.

## Deduction of Accrued Depreciation (so-called)

There is one point of importance to which I would like to refer somewhat at length if time allowed. I will, however, now refer to it very briefly. It is whether "accrued depreciation," so called, should be deducted from the cost of reproduction of the company's property, and a return allowed only on the balance of the investment.

"Accrued depreciation" as used does not mean deterioration which should already have been made good by repairs or replacements; it means or represents expired life of apparatus, still operating as efficiently as when new. Thus a gas retort, half of whose estimated period of life has expired, is producing just as much gas at just as low a cost as when it was installed; but it is claimed by some authorities, particularly the Public Service Commission of this District, that such retort should nevertheless be included in the valuation of the company's property in a rate case at only 50% of its cost value.

This theory was recently accepted by the Appellate Division of the Supreme Court in this State, in the Kings County Lighting case. It has never been passed upon by the Court of Appeals; it is in direct conflict with what I understand to be the holdings of commissions in other states, such as Connecticut, New Jersey and Wisconsin; and I believe that it is thoroughly unsound and will ultimately be so held in all courts. I may add that it has not been adopted by the Public Service Commission of the Second District, but is wholly contrary to the views of the engineer of that Commission as testified by him in the Westchester Lighting Company case, and also to the views of the engineer of the Public Service Commission of this district, who acted for it in the Kings County Lighting case, as since expressed by him to me.

This theory of a deduction from the new value of still efficient apparatus because a part of the life of such apparatus has expired, is based on failure to observe that the consumer is not the purchaser of the company's property; that he is merely a purchaser of its service. At the outset when the company first begins operation, it is conceded that the company is entitled to charge and the consumer is bound to pay a rate, which will furnish a reasonable return upon the full value of the investment plus a reasonable annual allowance to keep the property up and the investment therein unimpaired. This is elementary and conceded.

At the end of five years the property has been so maintained that it is delivering exactly the same service exactly as efficiently as before; and can anyone explain why a consumer in those circumstances should pay less for his service (as he would do if the capital investment upon which a return is allowed be reduced by deduction of so-called "accrued depreciation"), merely because some items of plant will then require replacement at a date in the future nearer than such date was at the beginning of operation? It would be equally sensible to say, as another has said, that a farmer should charge for milk an amount proportioned to the age of the cow that gives it, the price per quart being reduced as the cow gets along in years, although the milk remains just as good as ever.

The point is that it is of no concern to the consumer, so long as he gets the same service, whether the apparatus will need renewing in five years or ten years; the consumer pays the return on the investment, and an additional sum sufficient to produce a fund to maintain the plant and keep the investment unimpaired, and that is all that he has to do with the matter. It is the business of the company to keep the plant up after the consumer has thus done his part.

### Efficiency the Test.

In short, the consumer is interested only in the operating value, or operating efficiency, of the plant; and if it continues to operate at 100% efficiency, that is all the consumer can ask. I quote as follows from expressions of the engineer of the Public Service Commission of the Second District (Mr. Crowell) in the Westchester Lighting Company case:

> "As a general proposition in considering depreciation it must be remembered that (the company) is required to furnish 100% of service with the plant as it exists, and is entitled to a fair return on 100% of investment value.
>
> * * * * * * *
>
> "Q. It doesn't make any difference to the consumer whether the gas main supplying his premises is one year old or fifty, assuming them to be equally efficient?
>
> A. Not if satisfactory and adequate service is rendered.
>
> Q. It doesn't make any difference to the consumer whether the holder in which the gas which he consumes is stored, is five years old or thirty, assuming an unimpaired service value?
>
> A. Not if satisfactory and adequate service is rendered.
>
> Q. Does the failure of the owner of the property to lay aside a reserve for replacement of property in any way affect the consumer?
>
> A. Not if satisfactory and adequate service is rendered."

It is true that the Supreme Court of the United States, and some other courts following it, have expressed in general terms the view that some depreciation is deductible in a rate case; but it is fair to say that the subject never has been fully or adequately presented in the Supreme Court, and that that court has never declared that "theoretical depreciation" should be deducted representing merely expired life of still efficient apparatus, where it is a question merely of rates for service between a company and consumers.

In the Consolidated Gas case the Court deducted only an amount which would need to be expended as repairs, "to make the operating plant as good as new"; the Master declining to charge the company "with a greater and theoretical deficiency."

In the last expression of the Supreme Court, the Minnesota rate cases, it likewise merely referred to the deduction of depreciation, as proper; but there the question of depreciation was not seriously argued, and the court may have had in mind merely a sum (as in the Consolidated Gas case) sufficient to make the properties from an operating standpoint equal to new.

## Deduction for Depreciation Improper

I do not, however, think that even such a deduction is appropriate or sound. The deduction would usually amount to so little in a well kept property, that it is not worth much discussion and is allowed to pass without contention, as was true in the Consolidated Gas case; but with a public service commission empowered to enforce good service, it is a much sounder proposition to compel a company to keep its plants at the highest point of operating efficiency and then to allow the company to receive a return on one hundred per cent. of investment without deduction. In other words, the motto should be "100% of efficiency and 100% of return." Nothing else is or ought to be satisfactory either to the company or to consumers.

## Public Services as Monopolies

I shall now touch upon only a single additional point, the establishment of public services as monopolies.

Before the period of general regulation of public service corporations, both as to character of service and rates of charge, it was believed to be sound policy not only to permit but to encourage competition within the same community between companies established to render the same service. It was supposed that thus only, or most effectually, could good service and reasonably low rates be assured.

With the advent, however, of regulation, particularly since the establishment of public service commissions for that purpose, the view of intelligent opinion has changed, and even become revolutionized. It is now generally recognized that where existing corporations may be compelled to give efficient service and to charge only reasonable rates, it is a mistake to encourage or even allow unrestricted competition with the inconvenience to the community which this involves.

Thus where a gas company or an electric company is furnishing adequate service, it seems wholly unnecessary and undesirable that other companies should be allowed to come in to fulfil the same function, with the incident tearing up of the street and other inconveniences which such a process involves. Moreover, experience has taught that the usual result of the establishment of such competitive businesses is finally a combination in some form with a duplicated capital upon which the public is almost invariably compelled directly or indirectly to pay a return; with the result that rates are not reduced to so low a figure as would have been possible had a single corporation been involved and rates finally adjusted to pay a return only upon the valuation of its property alone.

Particularly in the case of the telephone, it is a distinct and perpetual nuisance to deal with two systems, part of your acquaintances being on one and part on the other. The users of the service must either have available a connection covering only a part of the community, or they must install two telephone services, the cost of which combined, quite independent of the inconvenience involved, usually exceeds the cost of a single and more efficient service.

Moreover, where any public service company is subject to rate regulation and compelled to bow to the views of a commission as to character of service and rate of return, it is only fair to the company itself that it be protected from unnecessary competition so long as it properly serves the public. Indeed, investors will accept a lower return on their capital, and consequently a lower rate may be established for consumers in cases where they are assured of such protection and against the embarrassment of a possibly ruinous competition; for competitors have been known to cut each others throats even to the point of selling their products below cost, when once the war is on.

In line with these thoughts the legislature of New York many years ago, and likewise the legislatures of some other states, passed laws providing that no railway should thereafter be constructed, unless there was first secured from the state authorities a certificate that the public necessity and convenience required it.

Within the last few years, upon the establishment of the present Public Service Commission in New York, the legislature passed further acts prohibiting the establishment of gas or electric plants, or the operation of gas or electric franchises, in any community in the state without a like certificate of public necessity and convenience; thereby affording protection to existing companies in all communities, so long as they continued to afford adequate and efficient service.

Very recently in Pennsylvania, in the first decision of importance rendered, I think, by the Public Utility Commission recently established for that State, the Commission refused to permit another company to enter a city in that state already supplied with service of the character proposed to be afforded by the newcomer, on the ground that the interests of the public and fairness to the existing service did not warrant its admission.

### Public Service Monopolies Commendable

It is important, therefore, to be noted that monopolies in public service companies are not now considered condemnable; indeed, they are considered commendable, where subject to appropriate regulation, as tending to the convenience of the public, to the efficiency of service, and to the establishment of the most favorable rates. The age when unrestricted competition was considered the only, or the best, protection of the public is past, never to return. The regulated monopoly, in case of public service corporations, is increasingly recognized as being the best solution of the problem from the standpoint of both investors and the public welfare.

## Conclusion

I fear that I have consumed too much of your time, and yet we have touched, and but superficially, on hardly more than one phase of the regulation of public service corporations. An adequate discussion of a single element in that phase, the question of "depreciation," would alone consume hours.

The subject is a large one, filled with intricacies and perplexities. When, therefore, any question of further regulation, and especially the question of rates, is raised, the matter should be approached conservatively and without any presumption against the corporation concerned. There are two sides to most questions, and there is no gain, but great chance of injustice, in hasty action. Almost everything that enters into the cost to public utility corporations of the service which they render, has been increasing in price within the last few years. It will cost the Consolidated Gas Company of this city in the current year for gas oil alone, at least $1,000,000 more than for the same amount of oil a year ago.

And finally, if allowances for doubt are to be made, it is far better for the community (to say nothing of the corporation) to err on the side of liberality in the treatment of investors than to discourage enterprise by denying capital its fair reward, or by other exhibition of apparent injustice.

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